The Metal Worker.

A Weekly Journal of the Tin, Plumbing and House Furnishing Stove Trades.

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Cornice Making.

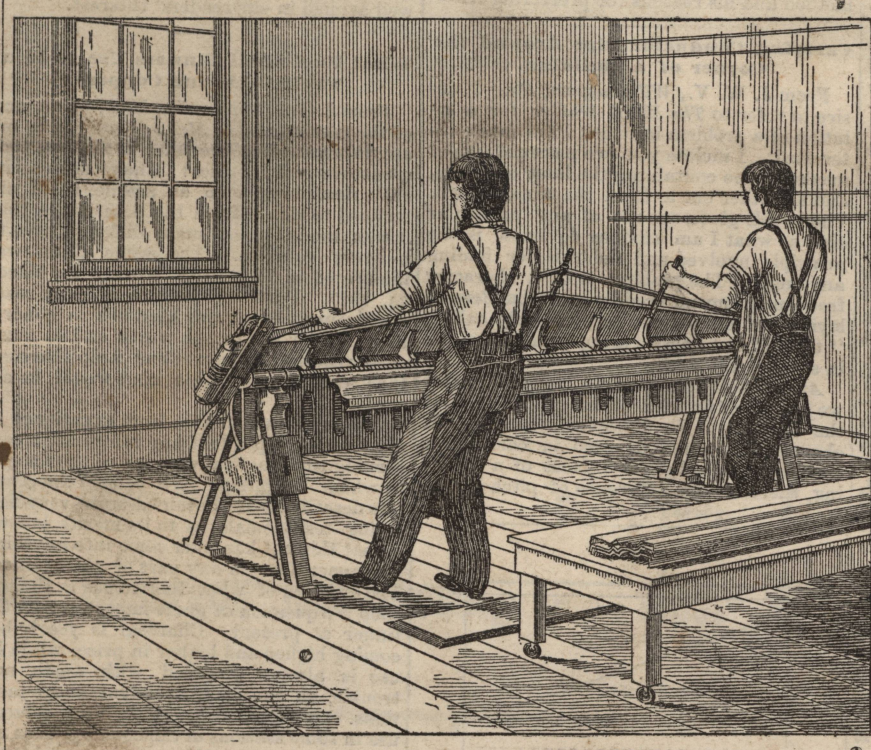
VII.

In preceeding articles we referred to the use of trucks in moving the iron and finished work from one part of the shop to the other. The natural course of the iron after leaving the pricking-machine is to the brakes and forming machines, one of the former of which is shown in the accompanying engraving.

In one of the early articles in this series we referred to the fact that the construction of the machinery used in the cornice business had been conducted by the individual manufacturers, and that the tools used in various shops were either peculiar to them or peculiar to a certain number of shops, all having their origin from a common center. In other words, one of the original men in this line of business having fitted up his shop with such tools as to him seemed desirable for the purpose, branch-shops growing out of his, or shops started by his workmen commencing business for themselves, were very likely to employ almost the same designs in the tools and machines which they used. Accordingly, in looking over the country at the present time with a view of ascertaining what machines for various purposes are being used, we are struck with the fact that but few types are employed; especially is this true of brake and forming machines, nearly all in use being derived directly or indirectly from a few original patterns.

Upon a close examination of the brakes they may be divided into two general classes, excluding for the time being certain power machines which have been quite recently introduced. One class of these machines makes bends only; the other is so arranged as to make both bends and forms. In the former class, one of which is shown in the engraving accompanying this article, the clamping members revolve upon a fixed bed-plate, while in the second class most generally one of the clamping members is stationary, while the bend or form, as the case may be, is made by the upward revolution of what is called the "leaf," which takes the place of the bed-plate. In this class of machines, for making forms, certain dies, commonly called "formers," are inserted in such a manner as to allow the leaf, when properly adjusted for the purpose, to force the sheet of iron over their shape. Opinions differ among manufacturers as to the advantages to be gained in the employment of these competing styles of machines. Some are altogether prejudiced in favor of those machines which combine the two operations, believing thereby they make a saving, in the fact that they only employ one machine where others are compelled to employ two. On the other hand, those who prefer brakes which make bends only, and for making forms employ other machines, contend that the two operations are so entirely dissimilar that they cannot be advantageously combined in one machine. It is our opinion that the latter class have the advantage in the argument. Careful inspection of work produced by these competing styles of machines seems to indicate that the sharpest bends and the best forms are imparted to the metal by machines constructed especially for each of the several operations, and that the machines constructed for performing either operation at will, according as the machine may be adjusted, produces far less satisfactory work.

Another point to be taken into consideration in discussing this question is that of the labor involved in working the two styles of machines. Where two machines are employed, one for the bends and the other for the forms, two workmen or two sets of workmen are advantageously employed, one at each machine. A given quantity of iron to be formed into moldings is first run through the brakes, and so many bends are made as are necessary to bring it to the proper condition for receiving the first form to be imparted to it. All the sheets are carried up to this point. They are then sent to the forming machine, and receive one or more forms as the case may be, coming back to the brake for the additional bends required to finish it. In this manner, working alternately between the two machines, each separate operation is performed on all the sheets before the next is commenced on any of them. Where two sets of men are not employed the same thing may be accomplished by the man working interchangeably between the two machines. On the other hand, in the operation of the machines which combine the two classes of work in one, it is, by certain manufacturers at least, considered economical to finish up each individual length complete before the next one is commenced. It is true that this does not necessarily follow by the construction of the machine. It would be possible to make all the bends through the sheets first and then adjust it for the forms and run the sheets through the second time. But the argument advanced in support of machines of this style is that a complete molding is made without removing the iron entirely from the machine. While admitting that it is possible to do this, we still believe it is much more economical, as well as much more conductive to the good quality of the work, to perform the operation in the other manner; and we believe our opinion in this matter is sustained in the practice of the largest manufacturers in the country. In other words, we believe the most enterprising establishments employ separate machines for the two operations.



Cornice Making.—The Dayton Brake.

The brake illustrated in our engraving is one of the simplest in parts and construction in use, as may be clearly seen by inspection of the cut. It consists of a bed-plate sustained in a suitable frame, back of which are two clamping members, the lower one of which corresponds to the top of the bed-plate. The iron is put between the jaws, and by means of the cams at the ends of the machine is clamped tightly in position, when the machine is revolved, thus making the bend. The angle of the bend is determined altogether by the eye of the workman. In a few cases we have seen this machine adjusted with a stop attached to the back, by which it was possible to revolve it to a certain point and no further, thus determining the angle of the bend absolutely. In putting the iron into the machine the lines of bend are determined by the prick marks, the operations connected with which are fully described in our last article. Neither in this machine nor in any other that we know of is provided a gauge removing the necessity for prick marks. In fact, the attachment of a gauge to a machine of this kind would be a matter of questionable convenience and economy. The lines most essential to be made at certain fixed points are those which ordinarily occur near the middle of the piece to be formed, and any variation in the iron or any irregularity is allowed to go into the space between the last bend or form and the edge, in what is termed the "flange." Accordingly, a gauge which would take the edge of the flange as a basis from which to work, would require absolute accuracy in the width of the sheets and in the working of the machine which would, in a measure, revolutionize the present method of manufacturing moldings.

In the description of brakes above we alluded to certain power machines which we said had been recently introduced. No brakes—referring now by the word brake to a machine which bends iron by revolving, in the general manner described in connection with the accompanying engraving—so far as we know, have been constructed to operate by power. The same thing in a measure is accomplished by machines which operate somewhat after the manner of stamps. These machines may be described as consisting of suitable parts or standards carrying a bed-plate, above which is a movable cross-head operated by cams or cranks. This cross-head raises a sufficient distance above the bed-plate to admit of passing a sheet of iron under it. The face of the bed-plate and the face of the cross-head receive dies which in section may be described as V-shaped. The hollow die is fastened into the bed-plate, and the projecting die, fitting into the hollow die, is fastened to the cross-head. The sheet of iron, being laid across the groove in the lower plate, is pressed into it by the descent of the upper die, and by this means a bend or angle is imparted to it. By varying the proportions of the V-shape, in the two dies the angle may be acute—a right angle, or obtuse, as the requirements vary. In like manner, by substituting shapes in place of the V-like dies, ogee, cavetto and others, as may be required, these forms are imparted to the iron. Thus the same machine is used for both bends and forms by using different dies.

So far as our knowledge extends, machines constructed upon this general plan constitute the only attempt that has yet been made to bend or form by power. To anyone accustomed to working galvanized iron, and who is familiar with the fine sharp forms that may be imparted by accurately working machines, it is evident that this method of bending and forming by means of dies is altogether unsatisfactory—in fact, is based upon wrong principles. There is always more or less spring to a sheet of iron, and no amount of pressure between dies will impart a shape to the iron which it will retain. In other words, such a method of forming must be employed as will admit, according to the quality of the iron, an exaggerated form, in the process of making it, sufficient to allow of all necessary springing back, in order that the form may be left perfect afterwards. This evidently cannot be accomplished by means of the machines last described.

The advantage likely to accrue from the introduction of economical and satisfactory power machines for bending and forming is very great. A moment's reflection will show inventors how considerable a field is here open for their ingenuity. The saving which would be accomplished by power machines for these operations, which shall work as satisfactorily as other power machines work in other directions, amounts to a very considerable sum. Whether the brake employed be of the character illustrated in our engraving or of the kind above described, having a leaf or folder by which to make the bend instead of revolving two members, or even if it be of the power kind above described, two men, or, at best, a man and a boy, are required to operate it. This bare statement does not give an adequate conception of the relative expense attending the present method of manufacturing moldings. Assuming an 18-inch stretchout as an average, and also assuming that an 8-foot machine is employed, and that No. 26, or the ordinary gauge of iron in use, is taken, and that the profile to be imparted to it is that of the ordinary ogee molding, let us consider the number of operations to be performed in order to shape one piece of iron. Throwing out the form, which in the use of such a machine as our cut illustrates would be made by another device, we find that the crown molding has seven, and, in some cases, according to the construction employed, eight bends. Here then are seven operations, consisting of lifting the sheet of iron, placing it in the machine to the given point, clamping it, revolving the machine, releasing it, and in some cases reversing it and repeating the operation. Two men or a man and a boy are required for this, which, reducing it to the measure of a single man's labor, makes it equivalent to 14 operations. The sheet of iron of the size we have described weighs a trifle less that 12 pounds; here, then, in the formation of moldings there is more than one tedious operation, so to speak, to every pound of iron. Compare this, for an instant, with the manufacture of wooden molding by means of the improved machinery employed in planing mills. By such a comparison only is it possible to judge of the disadvantage under which metal workers labor for lack of machinery, equal in character and capacity to that employed in competing lines of trade.

The brake shown in the accompanying engraving is of the pattern known as the "Old Dayton" brake. The original machine of this class was gotten up by Mr. Henry M. Sanders, at that time of the firm of Gebhart & Sanders, at Dayton, Ohio, but later of Chicago, and more recently of Boston. It is in extensive use throughout the central section of the country; a number of them are in the extreme Western belt, while a small number are employed in the Eastern States. Another machine in somewhat general use is known as the "Eagle" brake. This machine is the inven-

tion of Messrs. Wood & Sheridan, of Cleveland, Ohio, and is covered by letters patent. It operates by a leaf or folder, and is adjustable for making both bends and forms. Still another brake, which has been quite generally introduced during the last few years, is known as the "Eccentric Cornice Brake;" this is patented, and is manufactured by Thomas, Son & Co., of Cincinnati. This machine also works with a leaf, and is adapted for both forming and making bends. It has some features of adjustment not embodied in any other machine that we know of. Still other brakes are in use, although not so generally employed as those we have above mentioned, which possess features of merit, and which enjoy a fair share of popularity where introduced and understood. Among the latter may be mentioned the "Smith and Parkin" brake and the "Campbell" brake. The former of these machines in general appearance somewhat resembles the one illustrated in our engraving, although it is radically different from it in its operations. The latter has several peculiar features of adjustment about it, is operated in the form of a leaf or folder, and is arranged to do both forming and bending. In another article we shall give some consideration to the subject of forming machines, which, as has been indicated by repeated reference above, bears a close relationship to the subject of this article, inasmuch as forming is done in part by the same machines as are used for bends.

Comprehensiveness in the Pattern Book.

From A. C., *Boston, Mass.*—I would like to inquire how the new pattern book is progressing. I think in one part of the book you ought to publish a list of the different makes of machines, shears, hammers, small tools, &c., not neglecting the presses and dies. There should be a list of tools made by each manufacturer, with prices thereto and the discount. There should be a list of all the different parts of each machine, with prices and weight (when under 4 pounds) affixed. There also should be the name of the place at which the tool is made, because some manufacturers have their factory at one place and their office in another.

If the above information be included in the new pattern book, I think it will be a great help to the trade. At present, if I break a machine, I have to go to my stock dealer and find how much the broken part will cost, and get him to order one for me, as none of the dealers here keep on hand any repairs such as gauges, thumb-screws, &c. If a tinsmith is located 25 or 40 miles from his dealer, and some day, when rolling up a piece of heavy iron, he breaks a cog on his rolls, he has to stop, go to a machine shop, and get one made at the expense of a dollar or more, or else wait the time it requires to write to his dealer, who in turn writes to his manufacturer, who sends to his factory. Then the cog is sent to the dealer, and the dealer sends it to the tinner, who has to pay almost as much for it as if he had got it made at the machine shop. Now, if all these things are put into the pattern book, the tinner will have nothing more to do than to write directly to the factory where the tool is made, inclosing the price and adding 1 cent for each 2 ounces that the article weighs. In a few days he will get his cog at half the expense and bother that is at present required. In furthering this desirable scheme, I think all the manufacturers should lend you their cuts, so it would not cost much to print all that is wanted.

Another suggestion very important: Put ten or twelve blank leaves at the end of the book, so that when a manufacturer gets out a new machine he can print it on a sheet the size of theblank leaves, suitable for pasting into the book. By this plan the books can be kept up to date, so far as particulars concerning machines and tools are concerned.

Note.—The above correspondent has certainly taken a new departure in the matter of suggestions with reference to the pattern book. The idea of making it a general medium of trade information concerning tools, &c., is quite novel. We will not stop to discuss the impracticability of the scheme, for that must be so evident to all our readers that nothing we might say is necessary. It is evident that our correspondent has recently broken a cog of one of his machines, and further that it is the first one he ever broke, and we do not think another one will break in the next ten years. If it does we shall be pleased to have him write us.

Gutters in Connection with Standing Seam Roofs.

From F. W. S., *Spencerport, N. Y.*—Will *The Metal Worker* please inform me how gutters in connection with standing-seam roofs are arranged. Are they always made hanging, or is the tin laid over a strip or cleat which is fastened to the sheeting? Is it customary to pound down the seams where the roof joins the gutter? The answer to this will be a favor.

Answer.—Gutters in connection with a standing-seam roof are treated very much in the same manner as gutters in connection with a flat-seam roof, or, for that matter, in connection with roofs of any kind. There is nothing about standing-seam roofing which determines the character of gutter to he employed. The gutter may be a simple hanging gutter, or it may be arranged by means of a cleat or stop, as above alluded to by our correspondent, or it may be of the general shape known as a cornice gutter. With a hanging gutter the standing seams would be finished down to within a very few inches of the eaves. With a gutter formed over a cleat or stop, the standing seams would be finished down to within a short distance of the gutter, lining itself. And in the case of the cornice gutter, the standing seam would likewise be finished within a few inches to where the gutter proper commences.

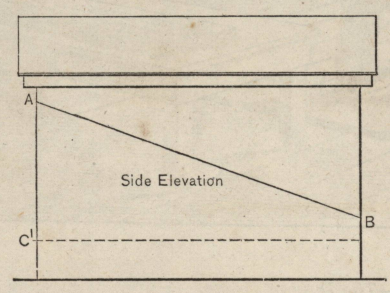
In *The Metal Worker* for August 9th, 23d and September 6th, 1879, we presented letters from several correspondents upon the subject of finishing the eaves of tin roofs. Not very much attention, in those letters, was given to the subject of gutters, but in at least one of the communications a method of finishing a standing seam was presented which is well adapted to use above gutters. In the use of a cornice gutter the lining of the gutter should be wide enough; that is, should extend far enough up the roof, to insure against all backing up of the water over the standing seams.

We purposely confine our answer to the above correspondent to general terms, believing that herein is suggested a topic of discussion which is well worth the attention of tin roofers generally. We shall be pleased to receive sketches and descriptive letters of the finishing of tin roofs above gutters from as many of our readers as see fit to give the subject that much attention. Much interest has been taken in similar exhibits already published, and we believe the benefit of such discussions is worth to each one the little trouble that it will cost him to contribute his method and his reasons for preferring it.

Carrying Conductor Pipe Around the Corner of a Building.

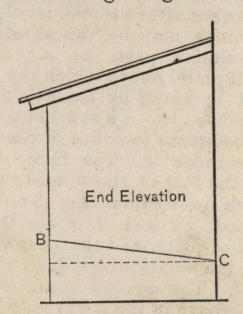
From J. W. V., *Williamsport, Pa.*—I desire to refer to *The Metal Worker* for a solution of a problem in which I am much interested. I inclose you two pieces of paper marked—one containing the lines of bevel, and the other cut to fit on the lines shown. The bevels given are not of any particular size, as what I am anxious to know is the principle involved and the rule for finding any angle. The problem is of a character frequently encountered by stair builders in laying out curves or, as commonly called, "twists," but I desire to apply the principles in sheet metal work.

Answer.—By our correspondent's letter we are given no idea of his application of the shape. It is, however, the same in character as would be used in carrying a conductor pipe along two faces of a building, there being a difference of pitch in the



Carrying Conductor Pipe Around the Corner of a Building.—Fig. 1.—*Pitch on Side.*

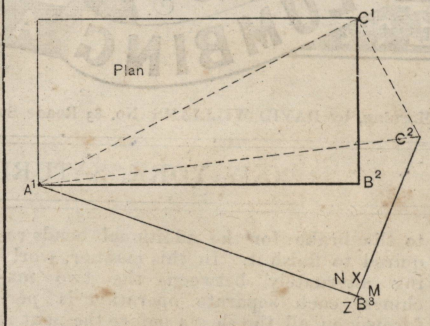
two runs of pipe. We see no advantage in publishing the illustrations of our correspondent's bits of paper, as they would only serve to show that what he is after is the manner of obtaining the angles or joints in a construction of this kind. In Fig. 1 of the accompanying engravings we represent a conductor pipe starting out at A, near the eaves, and continuing along the side of the



Carrying Conductor Pipe Around the Corner of a Building.—Fig. 2.—*Pitch on the End.*

house to B, there being a fall from A to B. In Fig. 2 we show the conductor pipe continued around the end of the building from the point B to the still lower point C. In Fig. 1 the space A C^1 represents the total fall in the pipe. We take it that our correspondent's requirement is the angle or joint that would require to be made at B in order to connect the two sections of pipe. In Fig. 3 is shown a plan of the building, with the course of the conductor pipe represented by A^1 B^2 C^1.

To obtain the angle of the elbow in the pipe proceed as follows: In Fig. 3 draw A^1 C^1, as shown, and from C^1 erect a perpendicular to it, as shown by C^1 C^2, making it equal to A C^1 of Fig. 1—or, in other words, the total fall in the pipes. Draw C^2 A^1. From A^1 as center, with A B of Fig. 1 as radius, describe an arc X Z, and from C^2 as center, with radius equal to C B^1 of Fig. 2, describe an arc M N, intersecting the arc X



Carrying Conductor Pipe Around the Corner of a Building.—Fig 3.—*Diagram of Angle.*

Z in the point B^3. Then A^1 B^3 C^2 will be the required angle. If our correspondent desires to use this in such a construction as conductor pipe, having obtained the angle A^1 B^3 C^2, the next step will be to obtain the patterns of the elbow to that angle by rules already published in *The Metal Worker*.

If we have misapprehended the intent of our correspondent's inquiry, and we are in some doubt whether or not we have taken him exactly as he wished to be understood, we should be pleased, upon receipt of further information, to give additional attention to his problem. In any event, the problem here presented and solved is one of frequent occurrence in tinner's work, and the space we have devoted to it cannot fail to be well applied in our readers' interest.

What Fuel Shall Tinners Use to Heat Their Soldering Coppers?

From S. D., *Coopersville, Mich.*—Can any of the readers of *The Metal Worker* give me any information concerning a fire-pot that uses stove coal for fuel? I have seen a circular describing such an article, but I am inclined to think, from the description, that it was made for too many different uses to be very valuable. The same thing was illustrated in *The Metal Worker* for March 24, 1877. I desire to inquire of your readers if furnaces of this kind are in general use. There is so much waste and so much care required to store and keep charcoal, that something of this kind would be acceptable.

Note.—We are unable from experience to give our correspondent any information concerning the practical working of the fire-pot to which he refers. We believe the circulars describing it contained some very flattering testimonials as to its merits, but we do not think it has ever come into anything like general use in any part of the country. The question of what fuel to use in the tin-shop is a question of great importance to the tinner at present. Charcoal is yearly becoming higher and higher in price, while its use is always attended with waste and trouble, as our corrrespondent above mentions. Gasoline, although in very general use in some sections of the country, does not seem to be just the thing, as was evidenced in the discussion of it that took place in these columns about a year since. What fuel, then, shall a tinner use? It is a good question for discussion, and we hope to receive many letters in answer to it. If any of our correspondents have anything original to offer in the way of designs of furnaces for burning anthracite or bituminous coal for this purpose, we shall be glad to receive sketches, which we shall take pleasure in engraving in order to lay them before our readers.

Chinese Gongs.

From W. C., *West Philadelphia, Pa.*—I would like to have you inform me if what are commonly known by the name of Chinese gongs are made anywhere in the United States. Could you give any information in regard to the history of that very useful article?

Note.—We do not know that Chinese gongs are made in any portion of the United States. Some years ago we heard that an attempt was made to manufacture gongs in this country, but it appears that it was not successful. The metal used is a bronze composed of copper and tin only. The proportions given by Dr. Ure are 25 parts tin to 100 parts copper. This is treated by suddenly cooling it in water, which gives it the remarkable resonant character that makes it suitable for gongs. It must, however, be thoroughly hammered all over its surface. The history of gongs, like that of most things of Chinese origin, is lost in obscurity. As a noise-making instrument, it is one of the most successful that is known to man. At close quarters it would be a very fair rival to a steam siren, while in its horrible quality it is, we think, without a rival.

A Remedy for Chapped Hands.

From A. N. W., *Toronto, Canada.*—I am very much troubled with chapped hands, and as my work is similar to that of many other readers of *The Metal Worker*, I beg to ask though the columns of that most useful paper for a remedy.

Answer.—The best we have found in our experience is glycerine mixed with a little carbolic acid and rose water. Druggists, generally, are acquainted with the preparation, and know the proper proportions of the ingredients. If any of our readers have other recipes, we shall be glad to have them write us. The question of keeping the hands in good order in a shop is one of no small importance to our readers generally. Let us have the result of the best experience in this matter.

How to Join a Bay Window Roof Against the Wall of a House.

From W. G. W., *Attglen, Pa.*—I wish to cover a bay window roof with tin to join a brick wall. I shall be obliged if you or some of your readers will inform me through the columns of *The Metal Worker* as to the best method of making the connection. Inclosed you will find a sketch illustrating just what I require.

Note.—The sketch represents an octagon bay window having a rather steep roof, the rafters of the same being concave. The problem presented is that of flashing against a brick wall to protect the edge of the tin roof which does not meet the wall in a straight line. Since the question raised is so directly in the line of the discussion of "How to Finish a Tin Roof Against Walls"—which has been in progress in *The Metal Worker* for several weeks past—we think it well to refer it to our readers without any attempt to answer it at this time ourselves. We shall be glad to receive sketches of methods of finishing it from as many of our correspondents as have anything to offer.

Champion Wash Boiler Maker.

From H. S. & Co., *Chicago, Ill.:* Your correspondent H. M. C., of Baltimore, Md., seems to doubt the veracity of some gentleman stating he can make 24 8-inch boilers in 10 hours. Now that is nothing. We have here in Chicago a man by the name of Timothy Fitzgerald, who works for a Mr. Monahan, that makes 30 8-inch wash boilers in 10 hours, and yet Tim does not need any chalk on his mallet. Of course, we did not see him do it, but we have his own word for it. We would like to see the opinions of "fellow chips" on this paragon of fast workmanship.

I C or I X for Roofs.

From T. S., *Lewisville, Pa.*—I desire to inquire what kind of tin makes the best flat-seam roof, I C or I X 14 x 20 charcoal roofing tin. Is the coating any thicker on I X, or I X X X, than on I C? If so, what is the increase for each X? An answer to the above questions through *The Metal Worker* will be a particular favor. There is a large brick school building here requiring a tin roof of best quality. There are two of us tinners bidding upon it. A dispute has arisen as to which makes the best roof, I C or I X tin. The reply of *The Metal Worker* is asked in settlement of the dispute.

Answer.—The coating on I X or I C tin is supposed to be exactly the same. That is, there is no attempt made in the manufacture of tin at putting a heavier plating of tin upon the I X sheets than upon the I C sheets. As we have several different times explained in *The Metal Worker*, I C and I X refer directly to the thickness of the plate, I C being equivalent to wire gauge No. 29, and I X being equivalent to wire gauge No. 27. Accordingly, so far as the coating of tin is concerned, there will be little or no difference between the use of I C and I X. On the other hand, by the use of I X a thicker plate is employed. Whether this be any advantage depends somewhat upon circumstances. It undoubtedly requires rougher usage to wear out a sheet of I X tin than a sheet of I C; accordingly, it is customary in many sections of the country to use I X in the gutters and I C tin for the body of the roof. We think it is only in exceptional cases that I X can be of any especial advantage for roofing purposes, although there is in reality but a very small difference between the thickness of I C and that of I X. The I X is more likely to break in forming the seam, or, if it does not break, is more likely to crack or unduly stretch the coating in the process of bending for either a lock or a seam. I X tin costs a trifle more per square than I C, and this cost, together with the disadvantages above alluded to, with the additional one of being a trifle harder to work, has always seemed to us sufficient to outweigh any other advantages it may be supposed to have on account of presenting a thicker covering than I C. In I C tin there is sufficient body of iron for all ordinary strains. The thickness of tin, as above stated, is as great as that upon heavier plates, and therefore whatever protection is afforded by the tin is quite as great in the case of I C

THE CAMBRIDGE.

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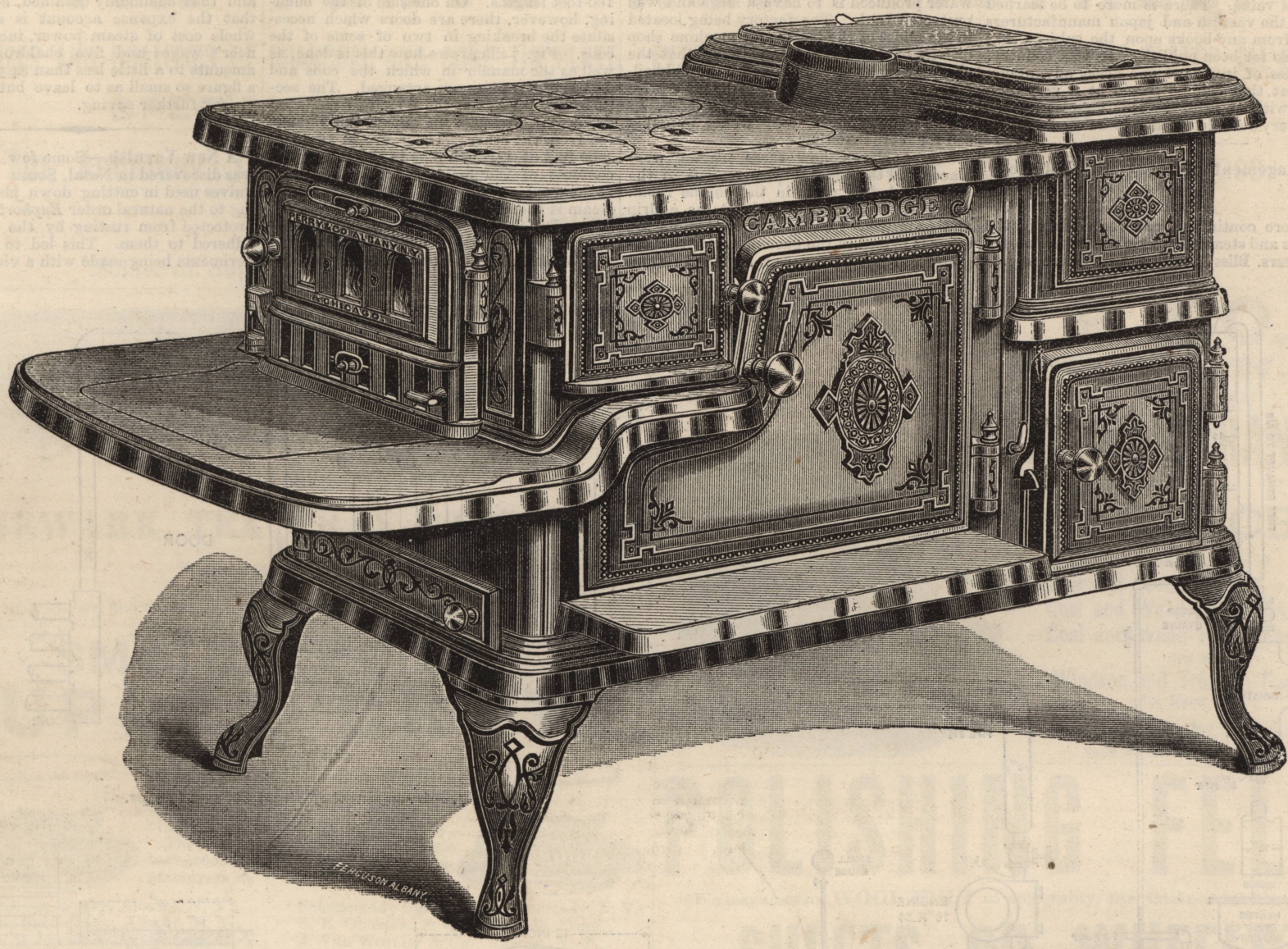

Square Stove, - - - - Nos. 6, 7, 8, 9.

With Reservoir and Closet, - - Nos. 7, 8, 9.

With Planished Reservoir and Closet, - Nos. 8, 9.

The heaviest Stove on the market for the cost.

A splendid baker. An elegant pattern.

The workmanship equal to any first-class Stove

Large numbers in use, and not one of them has failed to give perfect satisfaction.

PERRY & CO.,

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as it would be in I X or heavier. Hence, as we have previously stated in *The Metal Worker*, all things being equal, for ourselves we should prefer a roof of I C tin to one of I X tin.

Japanning Cast Iron.

From B. B., *Nunah, Wis.*—I would like some information in regard to japanning on cast iron such articles as reservoir lids. If you cannot give us the information, can you direct us where to obtain it? Is there any book upon the subject?

Answer.—So far as we know there is no book published which will give any information of value. There is more to be learned from the varnish and japan manufacturers than from any books upon the subject that have so far been published in this country. Articles of iron have one great advantage, in that they can be baked at a very high heat without injury. This enables a hard and very durable varnish to be used.

Management of Steam in Factories.

(Concluded.)

Before continuing our description of the boilers and steam fittings in use in the factory of Messrs. Bliss & Williams, we desire to correct an error which occurred in the early part of the article published in last week's issue. In asserting that the apparatus was designed especially for hard coal, we inadvertantly omitted after hard coal the words "and coke." Messrs. Bliss & Williams are at present using the apparatus with gas coke exclusively, as will be seen by the continuation of the article below.

Steam having been obtained in the most economical manner, the next important points demanding attention are the methods by which it is to be distributed and used. In the case in hand all the steam is taken to the engine, and, with the exception of the small quantity of steam taken to the office radiators, all that is used for heating is obtained by utilizing the exhaust. A 3½-inch pipe carries steam to the engine. This pipe is protected by some 2¼ inches of felt and paper, so that the external diameier of the pipe is rather more than 8 inches. The arrangement of the layers is similar to that shown in Fig. 6. With such a thickness of covering the loss of heat from such a pipe would be a mere nothing, not amounting to more than 8 or 10 per cent. of that of a bare pipe.

Having got the steam to the engine, the supposition is that in the engine itself it will be used with the greatest economy. If we increase the back pressure for the purpose of heating, it is because it is more convenient to use the low pressure steam thus obtained than it would be to take in steam from the boiler.

Low pressure steam, it is very generally admitted, is much more desirable for heating purposes than that of a higher pressure and temperature. It throws less strain on the joints and cocks, and can be made by condensation to give out all the heat that is needed. It is easy to see that there is some economy in putting a few extra pounds of back pressure upon the engine, and taking the whole of the exhaust for the heating. To do this with the greatest economy, the whole of the drip must be returned to the boiler, and we find that not a drop of water is allowed to escape that can by any means carry any heat away with it.

The first requisite in saving all the hot water produced is to have a large and well protected tank. The factory being located in the midst of the boiler and machine shop district of Brooklyn, it was found that the cheapest tanks to be obtained were old boilers. Two of these were bought for a price but little exceeding their value as scrap. At the present moment they would probably sell for more than they cost.

Fig. 5 shows how these boilers were placed and the general arrangement of the steam and drip pipes in the engine room. The small one on the roof acts as a drip and condenser for the exhaust, while the other is placed in the ground under the engine-room floor, to answer as a tank from which the pump draws its supply of water for feeding the boiler.

The drip pipe from the coils, seen near the center of the old boiler, brings all the water of condensation from the steam pipes, radiators, coils and steam apparatus in the factory. This is its chief source of supply. The main steam pipe has a drip which drains all the water which may be formed in it during the night. Into this drip are brought the pipes leading from the cylinder cocks, and the pipe is then led into the boiler.

The exhaust leaves the engine in a thickly-jacketed pipe and goes into a heater, shown on the left in Fig. 5, which has 48 feet of 1½-inch pipe for heating the feed water. It then rises in a 5-inch pipe to the roof, where it is turned over so as to exhaust into the small boiler, from which a drip leads down to the old boiler tank under the floor. Half way up the pipe is a stop valve, and just below it a branch which leads to the coils in the main building.

The pipe as far up as the stop-valve and the branch which leads to the radiators have a very thick covering of felt, asbestos, &c. The arrangement of the clothing is shown in Fig. 6. The inside layer is asbestos; then comes a thick layer of hair felt. This is wrapped in paper and another layer of felt put on outside. Paper and canvas inclose the whole. The pipe is 5-inch, but the outside diameter of the whole amounts to 12 inches. Through such a body of non-conducting material, heat passes so slowly that it may almost be said to be impervious.

When it is desired to heat the building the exhaust is turned to the coils by shutting the stop-valve seen in Fig. 6. From the time that the steam leaves the engine room, the drip is all carried forward. With rare exceptions both air cocks and drips from the coils lead into the return pipes, so that there is no annoyance of blowing off steam into the building.

The main distribution of the steam in the factory is made upon the under side of the second floor, each system of coils having a single rising main to itself, arranged so that it may be cut off at pleasure from the others. Most of the coils are made in about 100-foot lengths. On one side of the building, however, there are doors which necessitate the breaking in two of some of the coils. Fig. 7 illustrates how this is done, as well as the manner in which the coils and details of the pipes are arranged. The sections on each side of the door are made independent, although the one on the right is fed from the other. There are in all about 4000 feet of 1¼-inch pipe in the coils. The contents of the building to be heated is 265,000 cubic feet. The distribution of the steam is begun with 4-inch mains, which are reduced as the extremes are reached. Large sizes of pipes are used with the especial purpose of reducing the back pressure upon the engine. It is calculated by those who make steam heating a study, that five pounds pressure will distribute steam through about 1600 feet of properly constructed pipes, while scarcely any observable pressure will be needed to drive it through 1000 feet of 4-inch pipe.

Usually men working at the bench make much complaint that steam heat is uncomfortable. The hot air rising from the pipes strikes the underside of the bench and escapes upward at the edge, just at the point where the workman is standing. The result is that the lower part of the body is kept in a constant perspiration and in general discomfort.

The bench adopted by Mr. Jordan, and shown in Fig. 8, does away with this trouble, while it is at the same time a first-class bench. Along the outside wall is placed a 4 by 4-inch stringer, A in Fig. 8, held in place by bolts passing through the wall and secured on the outside by star washers, B. On these are bolted cross pins, whose outer ends rest upon the posts D, 4 inches square, in the usual fashion. Three-inch plank, laid upon the outer one, is 14 inches wide and of hard wood; these complete the bench. At the back a board, 6 inches wide, finishes the bench and leaves a space of 5 inches between the back of the bench and the wall. This space is shown at E. The heated air, instead of flowing out in a stream against the legs of the workman while a descending draft of cold air from the windows cools the upper part of his body, meets with the cold air from the window G, giving a very pleasant heat without any disagreeable results. Incidentally, there is a gain in having more light under the bench, which is, on that account, less likely to have a rubbish heap beneath it out of the way and out of sight and reach. The holes necessary for holding the stringer were made by building pieces of iron rod into the wall at the proper hight and withdrawing them before the mortar was hard.

The duty performed by this boiler and heating apparatus in this factory is very satisfactory. We have not accurate figures which would enable us to institute a comparison between the economy attained here and that commonly obtained, but we know that the expense account is small. The whole cost of steam power, including engineer's wages and five chaldrons of coke, amounts to a little less than $4.50 per day—a figure so small as to leave but little margin for further saving.

A New Varnish.—Some few years ago it was discovered in Natal, South Africa, that knives used in cutting down plants belonging to the natural order *Euphorbiaceæ* were protected from rusting by the gum which adhered to them. This led to further experiments being made with a view of utilizing the gum as a preservative material. Iron plates were coated with it, and subjected to immersion in the waters of South Africa, which are stated to be proverbial for their foulness and for the rapidity of the growth of vegetation. The euphorbia in Natal grows in close contiguity to the sea shore, so that there was ample opportunity for severelv testing its value as a protecting covering for iron against corrosion and marine growth. The experiments proving successful, it was then sought to put the discovery into a practical form. To this end the gum was dissolved in a preparation of spirits, and this was found to be a ready means of applying it as a coating for ships' bottoms, and for ironwork generally requiring such protection, the spirits evaporating and the gum being left on the surface of the metal. A sheet of iron coated with this preparation was placed in the waters in the Naval Dockyard at Chatham, where anything immersed becomes rapidly fouled. At the end of two years the plate was taken out and was found to be quite clean and free from fouling and corrosion. The composition has also been successfully tested in Africa against the ravages of the white ant. These successes have led to its adoption in practice for various purposes, and it is now benig introduced in England.

A story comes from Nemahah County, Mo., that one David Meisenthaler was killed a few days ago by a meteor or aerolite. He was driving cattle from the field when the meteor descended obliquely through a tall

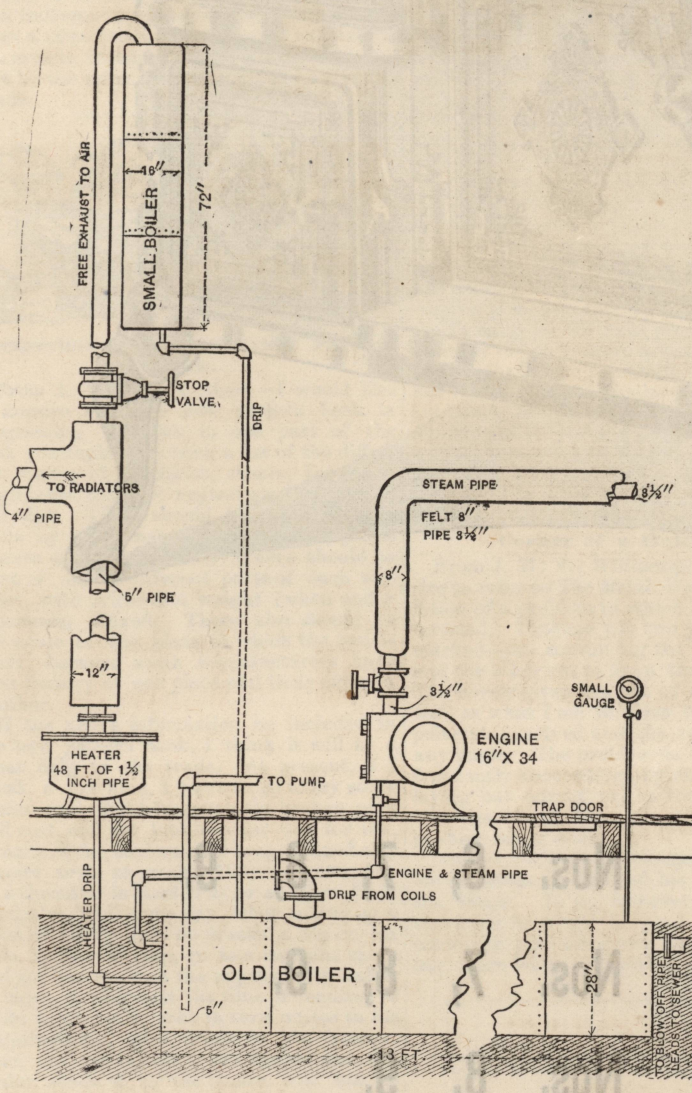

Fig. 5.—Arrangement of Pipes and Tanks to Save Hot Water.

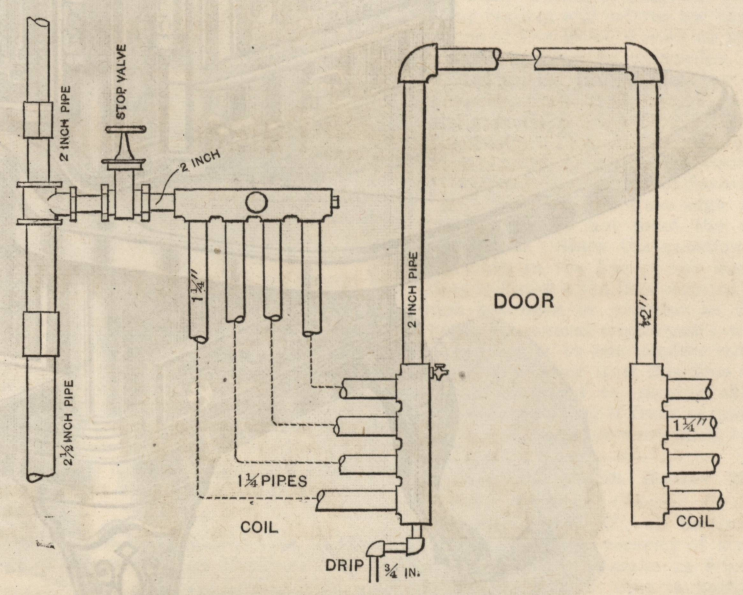

Fig. 7.—Arrangement of Steam Coils and Drips.

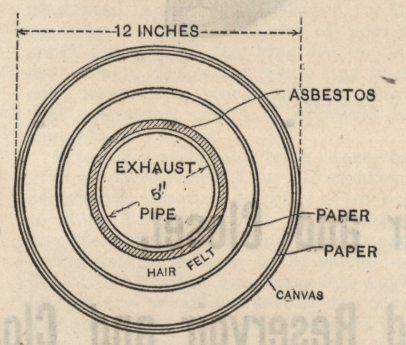

Fig. 6.—Section of Exhaust Pipe and Jacket.

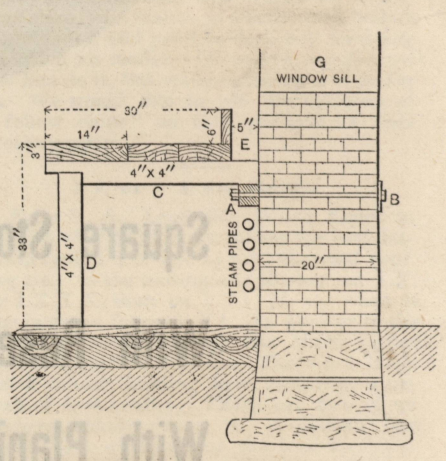

Fig. 8.—Steam Coils Under Benches.

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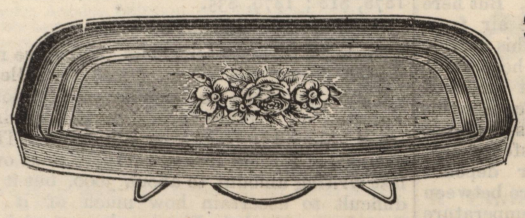

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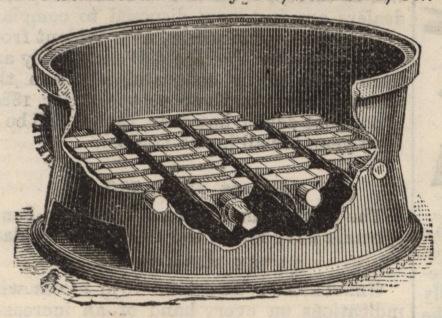

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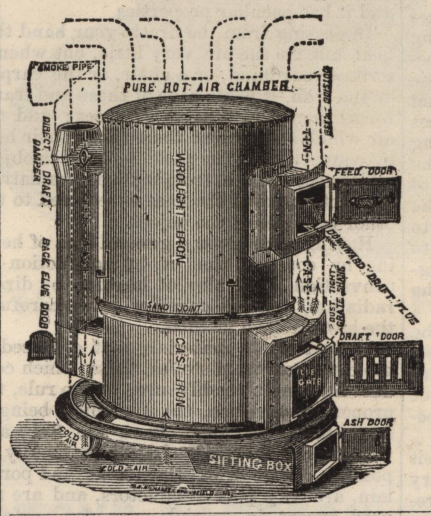

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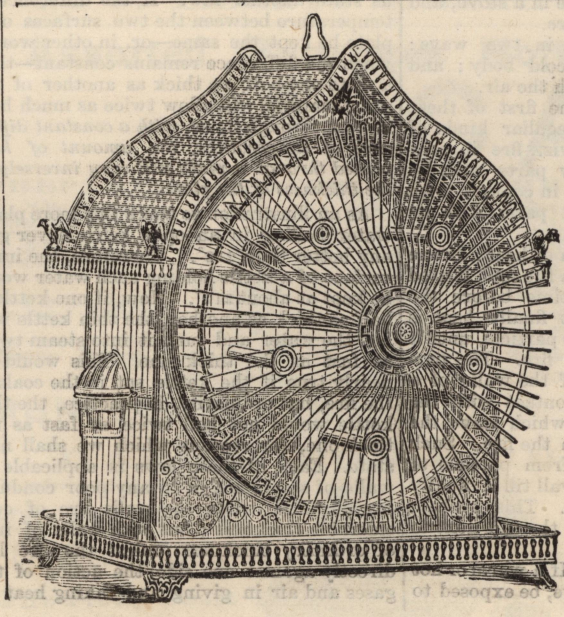

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maple, cutting the limb as clean as though it had been a cannon ball. It struck Meisenthaler near the shoulder, passing through his body obliquely, and burying itself two feet in the earth. The meteor is composed of iron pyrites, round and rough, about the size of a common water bucket. We never before heard of an iron pyrites aerolite, but then we cannot undertake to say that there are not plenty of them meandering around through space, waiting for a good chance to kill cattle-drivers.

The Phenomena of Heat.

Some of its Laws Pertaining to Stove Construction.

BY W. J. KEEP.

In the past history of stove construction there have been periods when some constructor has taken a departure from the generally received forms and arrangements, and has presented to the public some device which has had such decided advantages as to cause other designs to follow their lead, until the later form becomes the common one. The heating stoves now popular are very different in form and construction from the stoves made in 1869. Ten years ago old constructors felt that there could be no improvement in the heating stoves of that day, and all that could be done would be to vary the external design.

The form and construction of magazines most engaged attention, the difficulty being to prevent the intense heat immediately below the lower end from destroying the nose of the magazine. A great deal was said about the escape of gas, and various devices were contrived to prevent gas from escaping from the top of self-feeding stoves. The products of combustion were compelled to ascend to the top of the stove, around the magazine, before entering the flue leading to the base, and this arrangement tended to cause the coal in the magazine to become ignited, and thus aid in the destruction of the interior portions of the stove.

In these stoves the greater portion of the heat generated was taken up by the gases from the fire, and the general aim of construction was to increase the amount of heating surface, to cool down these gases before they entered the chimney.

The fire-pots and magazines would melt down in a short time, and it was necessary to make a large portion of these parts of fire-brick, or removable, so as to be easily replaced.

The change in construction which was inaugurated about 1870, by which the parts that had previously been so easily destroyed became almost indestructible, was brought about by a study of the laws of heat, and varying construction so as to liberate the heat from the fire before it could melt the interior of the stove. This year also brought to the attention of the public devices which had been the subject of experiment for several years previously, and which have become so popular now.

At first both manufacturers and users objected to the exhibition of the ash-covered fire-pot, and only those who knew enough of the laws governing heat to appreciate the qualities of the new construction, had any enthusiasm regarding them. When a few years' use had proved the superiority of the new stoves, a tide set in in their favor which swept everything before it. At the present day nearly all of the popular base burners are made after this same general pattern. This great revolution in stove construction within 10 years leads us to speak of the principles governing their construction which had been, to a great extent, overlooked previous to 1869.

In treating of the subject of heat we shall need to define a few terms, so that all shall attach the same meaning to the words we use.

The tendency of any hot body is to give its heat to any colder body which may be near it. Nature is constantly striving to equalize temperatures. The hot body which we are to consider is the fire in a stove, and we shall, therefore, call it fire.

Fire parts with its heat in two ways: First, by contact with a cold body; and second, by radiation through the air.

We shall further divide the first of these methods to indicate two peculiar kinds of contact with cold bodies, viz., fire in contact with a cold *solid* body parts with its heat by *conduction*. When in contact with *liquid* or *gaseous* bodies it parts with its heat by *convection*.

To explain the conduction of heat: If one end of a poker be put into a fire and heated red hot, it will be some time before the other end feels warm, but finally heat is transferred from particle to particle, until it reaches the end not in the fire. The particles forming the surface of the walls of a stove which are in actual contact with the fire, or with the hot gases which leave the fire, receive their heat from the fire. Such heat is then passed along from particle to particle through the stove wall till it finally reaches the outside surface. This heating one particle by contact with the one next to it is conduction.

To illustrate convection: If a warm or hot body, as, for example, a stove, be exposed to the atmosphere, the air that is in contact with the surface of the stove will become heated, but this heated air does not conduct its heat to that next to it, but rises to the upper part of the room, and permits that which was next to come against the stove to be heated and to rise in its turn

The same process takes place when a liquid is boiled in a kettle. The fluid which lies against the bottom of the vessel becomes hot and rises to the surface, while the colder fluid takes its place and goes through the same operation. The reason why the heated air or liquid rises away from the heating surface is because, on becoming heated, it expands and a given bulk is lighter than that next to it, and there being but little friction between the particles, the heavier air or liquid crowds under and pushes the heated portion upward. This method of conveying heat to the air or water is called convection, and by it every portion of the liquid, or of the gas, must receive its heat directly from the heating surface by touching it. When heating by conduction or by convection, the cold body is always in contact with the fire.

The second method by which fire parts with its heat is by radiation. When you hold your hand before a bright fire or stand in the sunshine you feel heat which is not conveyed to your hand by being conducted through any body to you, but which, like light, leaves the hot body and travels to you in straight lines, This heat is *radiant heat*, and it has peculiar properties.

In passing from the fire to your hand this heat affects the air very little, but when it strikes your hand, or a chair, or the carpet, or the wall, it heats each of these and transforms them into heating surfaces; and the air which lies against them takes their heat by convection. The particles of each object which receives heat from the fire by radiation, conduct a part of the heat so received to the other particles of the object.

Having now given a general idea of heating by contact, that is, by conduction or convection, and also of heating by direct radiation, we will consider more carefully the laws of each method.

In relation to materials that are used in the construction of stoves, those which conduct heat most readily are, as the rule, the proper ones to use, the sole object being to draw the heat away from the fire and transfer it to other objects as rapidly as possible. Fire-brick, soap-stone and porcelain, are very poor conductors, and are not used except in special cases for surfaces which give their heat to the air of rooms. Iron conducts heat very well as compared with other materials, and for this, and other reasons of a practical nature, it is very generally used in the construction of heating apparatus. Theoretically, as will be hereafter seen, the less the thickness of the wall of a stove the better; thus mica and sheet iron have advantages over thick castings. But there are serious objections to sheet iron which overbalance this slight advantage, and in practice this superiority is only apparent with very thick castings, or in non-conducting materials.

We stated before that in the nature of things a hot body tends to part with its surplus heat until all surrounding objects are of the same temperature as itself. The greater the difference in temperature between the fire and the cold body the greater will be the tendency of the heat to be transferred from the fire to the cold body. A law of heat appplying to this case is founded on the fact that the greater the difference of temperature between the two surfaces of a plate, the greater will be the amount of heat that will pass through the plate in a given time; or, *the amount of heat flowing through a plate, varies directly as the difference of the temperature between the two surfaces of the plate.*

To illustrate more fully, with a stove containing a fire standing in a room, the colder the room (*i. e.*, the greater the difference between the temperature of the fire and that of the air in the room) the more heat will pass through the walls of the stove in a given time to heat the air of the room. Let us state another law. If the difference of temperature between the two surfaces of a plate be kept the same—or, in other words, when the difference remains constant—then a plate one-half as thick as another of the same material will allow twice as much heat to pass through it, or, *with a constant difference of temperature, the amount of heat passed through a plate will vary inversely as the thickness of the plate.*

As an illustration to make this more plain, water boiling in an open kettle never gets any hotter than 212°. Therefore, the inner surface of a kettle holding such water would be kept at about 212°. Now, if one kettle is half as thick as another, the thin kettle will boil the water and turn it into steam twice as fast as the thick one. This would be nearly true if the kettle sat in the coals of the fire, but ordinarily, in practice, the thin kettle would not boil twice as fast as the thick one, for reasons which we shall now state. Each of these laws is applicable to walls of soapstone, or to any poor conducting material, when the walls are of considerable thickness; but with walls of iron of ordinary thickness (unless the fire lies directly against one side) the action of the gases and air in giving and taking heat by convection is such as to produce what Prof. Rankine calls the surface resistance of the plate, and this resistance is so much greater than the internal resistance of the iron to conduction, that it reduces the temperature of the two surfaces of the plate to nearly the same point; and therefore in practice we do not find the difference in efficiency between thin and thick plates which theory indicates. In stoves made 10 years ago almost the whole of the heat generated by the fire was taken up by the gases which left the fire, and in their passage through the flues of the stove these gases gave out their heat to the inner surface of the walls of the stove, but, as stated by Rankine, the heat was with difficulty transferred to the plates. This made it necessary to make a large amount of such absorbing surface. After being absorbed, the rapidity with which the heat traversed the plate from the inner to the outer surface depended upon the difference in temperature between these two surfaces. The inner surface could absorb from the gases only enough to bring its temperature up to that of the gases, but the surface resistance prevented the surface from absorbing this amount of heat. The only way to cool down the inner surface so that it could take more heat from the gases, was to conduct the heat through the plate to the outer surface and give it up to the air in contact with this outside surface. But here the same resistance prevents the air from rapidly absorbing the heat from this outside surface. The result is that all the heat which passes through the plate is not removed from the outside surface, which causes this surface to become nearly as hot as the inner surface. As the rate of the transfer of heat from one surface to the other depends upon the difference in temperature between the surfaces, and as the temperature has become nearly the same, there will be but little flow of heat through the plate. This explains why a fire-pot will soon burn out which has coals on one side almost hot enough to melt iron, and a flue filled with gases as hot as gases leaving such a fire can be made on the other side. We see also how poor the plan of causing gases to absorb all of the heat from burning coal, and then abstracting this heat and transferring it to air by a large amount of surface exposed to such gases and air. Before leaving the subject of conduction it may be well to refer the reader to the remarks of Dr. Derby, in his little work on "Health and Anthracite," with reference to the conduction or passage of carbonic oxide (a poisonous gas always more or less present in an anthracite fire) through *red-hot* plates of cast iron, though this is entirely foreign to the subject which we are considering. There is no possibility of this, however, if the iron does not become red hot. Dr. Derby recommended the making of stoves entirely of wrought iron, riveted to gether gas tight. But this is impracticable, and has given dishonest or ignorant makers occasion to advertise stoves made partly of sheet and partly of cast iron, as obviating the difficulty pointed out by this writer and by those who agree with him; whereas, owing to the difference in expansion between the two kinds of iron, such stoves are only suitable where cheapness is the chief object. This last difficulty does not, however, affect stoves where the sheet is simply used for an outside finish, and where the joints are not exposed to a high temperature.

(To be continued.)

Since our article of last week reviewing the recent course of the iron market, prices have experienced a still further improvement, and there are many who would gladly wager any reasonable sum that before the upward tendency is checked No. 1 iron will be quoted firm at $40 per ton. In the New York market sales amounting to several hundred tons of No. 1 Foundry Iron have been made during the week at $34.50, and we hear rumors of transactions at $35, but are not able to trace them. Enough business at these high figures has been done, however, to establish a much higher range of prices than was current a week ago, and we quote on a very firm market as follows: Foundry No. 1, $34 @ $35; Foundry No. 2 X, $32 @ $33; Gray Forge, $31 @ $33.

It is difficult to say anything in regard to the future, but the fact of the workshops in all parts of the country being full to overflowing with work, seems to insure a continued heavy consumption of Iron. The impression is general that prices of Pig Metal will show another heavy advance before the first of May, and, if the revival in Europe is at all in proportion to what it is here, there can be little doubt that the appreciation in values during 1880 will equal, if not outrun, that of the year now closing. Fears are expressed, however, that "the thing will be overdone," and ultimately there is no doubt that it will be overdone; but, in the meantime, parties who have heavy contracts on hand, and others of a profitable character in prospect, are not going to be restrained from purchasing to cover their requirements on the ground that by so doing they assist in forcing higher prices. For the present this appears to be the actual condition of affairs, and although consumers are now buying twice and three times as much for forward delivery as they did during the past two years, it is simply because their requirements are proportionately heavier. This has been their experience during 1879, and will no doubt be repeated during 1880.

Mr. Swank, secretary of the American Iron and Steel Association, estimates the production of Pig Iron during 1879 at 2,800,000 gross tons, against 2,302,000 tons in 1878, which is within about 2 per cent. of the heaviest years ever known in the history of the trade. The importations of Pig Metal during the year are estimated at 275,000 tons, giving a total supply for 1879 of upward of 3,000,000 tons. This amount, large as it is, has been easily absorbed, and buyers have far more difficulty in placing orders to-day than they had a year ago, although prices are now $12 to $18 per ton higher. The following shows the quotations of No. 1 Foundry Iron at the close of several years: 1872, $45; 1873, $32; 1874, $26; 1875, $23.25; 1876, $21; 1877, $19.50; 1878, $18; 1879, $35.

SCOTCH PIG

also shows increased firmness. Sales are reported during the week of 500 tons Glengarnock, 400 tons Gartsherrie and 200 tons Eglinton on private terms, besides sundry small lots said to be at very full figures. The arrivals of foreign Iron at this port since our last writing amount to about 3000, but it is difficult to ascertain how much of it is Scotch, as English Pig has been arriving pretty freely of late, and the brands are not classified in the reports. The market has gained strength, and we quote a shade higher than last week's figures, viz.: Eglinton, $28 @ $29; Summerlee, $28.50 @ $29; Glengarnock, $39; Coltness, $31, and Gartsherrie, $29 @ $30.

THE OUTLOOK FROM THE DEALER'S STANDPOINT.

It is probable that the retail dealers in stoves find cause for complaint at the advance in the manufacturers' prices since last fall, chiefly for the reason that they have found it difficult to secure any considerable advantage from the better prices charged by manufacturers. The working classes are now, speaking generally, earning good wages, and are better able to buy what they need than for some years past; but their wants are so numerous and varied, owing to long-continued economy, and there are such heavy arrears of debt to pay up that they have had comparatively little money to spend for anything that was not immediately necessary. A stove is an article which may have a life of five years or twenty-five, according to circumstances. Many who, under ordinary conditions, would have bought new stoves this fall, have postponed the purchase another year—not because they have not had the money to buy with, but because they have had so many other and more imperative needs to satisfy first. For this reason the retail stove business has not been as brisk as some others, and it has not been possible to advance the price of stoves to consumers in proportion to the increased cost to the dealer. This will be corrected another season, and while dealers are just now disposed to complain of the advances in prices, as is evident from their letters to *The Metal Worker*, they are even more to be congratulated than the manufacturers on their prospects for 1880. We do not doubt, however, that it will be a good year for all in the trade.

Prices for 1880.

The stove manufacturers of Eastern Pennsylvania have issued the following circular:

TO THE STOVE TRADE.

GENTLEMEN: The year 1879 closes with indications on every hand of an increased demand and a consequent advance in the prices of manufactured goods of every kind during the coming year. Especially is this the case with the industry which we represent. Stove manufacturers and stove dealers will alike close the season with lighter stocks of goods on hand than have been known for years.

Notwithstanding the fact that almost all the iron furnaces have been run at their full capacity during the fall, the demand for pig iron has steadily kept pace with the supply. The increasing foreign demand and the rapid advances in ocean freights, have checked the shipment of foreign pig irons to this country; and our home furnaces will enter upon the year 1880 without any iron on hand, and with orders already entered for as much iron as they can produce for some time to come.

Such being the facts, there is a strong probability, amounting almost to a certainty, that the price of iron will be considerably higher during the year 1880 than it has been at any time during the past year. Realizing, therefore, that the condition of business requires such action, we hereby notify our customers that on January 1st, 1880, we shall cancel all orders accepted prior to

GLOBE VENTILATORS & CHIMNEY CAPS.

Twenty Sizes. Made of Galvanized Iron.

SMOKY CHIMNEYS CURED!

Public and Private Buildings and Railroad Cars Perfectly Ventilated.

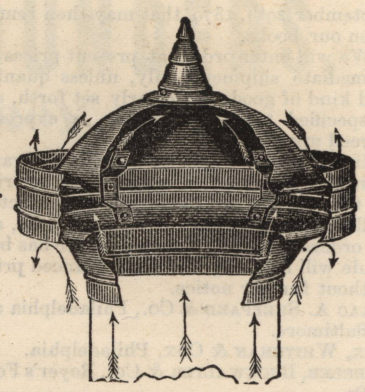
STATIONARY, ORNAMENTAL, NOISELESS, STORM PROOF, DURABLE, SIMPLE and CHEAP.

Send for Price List. Working Model sent on receipt of 20 cents, to pay postage. Manufactured and for sale by

GLOBE VENTILATOR CO.,

OFFICE, 203 River St., Troy, N. Y.

Wholesale Agents for New York City and vicinity, **ABENDROTH & ROOT MFG. CO., 28 Cliff St., N. Y.**
Wholesale Agents for Phila., Pa., and vicinity, **MERCHANT & CO., 525 Arch St., Phila.**
Wholesale Agent for Boston, Mass., and vicinity, **CHAS. M. BROMWICH, 613 Broadway,** S. Boston, Mass.
General Agents for Chicago and vicinity, **HAY & PRENTISS, 37 S. Canal, Chicago, Ill.**
Wholesale Agents for Louisville, Ky., **SMITH, BAGBY & CO., 167 First Street, Louisville, Ky.**



WESTON DYNAMO-ELECTRIC MACHINE

NICKEL.

The rapid increase in the use of Nickel-Plating owing to the introduction of the Weston Machine and the very low price of nickel material, enables us to give greatly reduced estimates for complete outfits.

We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or mat surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., $250.

We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fuller, Warren & Co. Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto and many others.

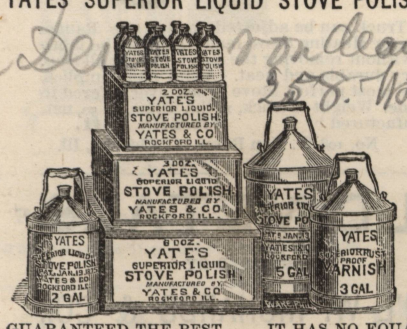
INFRINGEMENTS.

We call attention to infringements of the Weston Machine, in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

CONDIT, HANSON & VAN WINKLE
Sole Agents *NEWARK, N.J. U.S.A.*
ENGLISH AGENCY, 18 Caroline St., Birmingham.

Send for circular. **Keystone Portable Forge Co.,** *218 Carter St., Philadelphia.*

YATES' SUPERIOR LIQUID STOVE POLISH.


2 DOZ. YATES SUPERIOR LIQUID STOVE POLISH MANUFACTURED BY YATES & CO ROCKFORD ILL.
3 DOZ. YATES SUPERIOR LIQUID STOVE POLISH MANUFACTURED BY YATES & CO ROCKFORD ILL.
6 DOZ. YATES SUPERIOR LIQUID STOVE POLISH MANUFACTURED BY YATES & CO ROCKFORD ILL.
YATES SUPERIOR LIQUID STOVE POLISH
YATES & CO ROCKFORD ILL
2 GAL
5 GAL
3 GAL

Patented Jan. 19, 1875.

GUARANTEED THE BEST. IT HAS NO EQUAL.
NO LABOR—NO DUST.

Six years in the market. The demand constantly on the increase. With this polish one man can polish from three to five Stoves (average sizes) in one hour.

One application will protect a stove from rust in the dampest places.

Warranted to be Precisely as Represented.

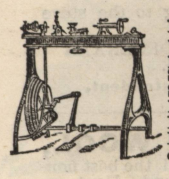
This Polish must not be confounded with the stove varnishes and stove paints that have been forced on the market during the past few years.

Send for Circular. Manufactured exclusively by
YATES & CO., Rockford, Ill.

For sale by SIDNEY SHEPARD & Co., 86 Lake St., Chicago, Ill.: SOLAR STOVE WORKS (L. D. Wynn, Agt.), Kansas City, Mo.: JOHN DERUNDEOU, 258 Water street, New York City: WESTERN STOVE MFG. Co., 406 N. Main St., St. Louis, Mo.; SIDNEY SHEPARD & Co., 68 Main St., Buffalo, N. Y.

ISRAEL H. JOHNSON, JR., & CO.

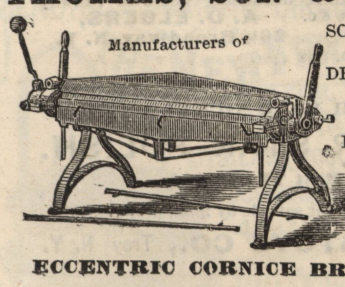
Tool and Machine Works,



Manufacturers of Lathes of all varieties (for foot or steam power), with their supplies, Screw, Lever and Drop Presses, Shears, Jewelers' Tools and Machinery. Also, Mortimers' Patent Rapid Transit Wrench. Designing and Building of Special Machinery, Mill Work, &c.

Office, 440 N. 12th St., Philadelphia.

THOMAS, SON & CO.,



Manufacturers of SCREW, LEVER, DROP AND POWER PRESSES, DIES, and Pat Impr'v'd Double

ECCENTRIC CORNICE BRAKE.

227 W. 2d St., Cincinnati, O.

Send for circular.

ACTIVE STOVES.

Also,

A Choice Assortment of other first-class and Cheap

Cooking and Heating Stoves,

CINCINNATI STOVE WORKS,
(Late GALWAY, SEMPLE & CO.)
Manufacturers,
Nos. 146 to 180 East Front St.,
CINCINNATI, OHIO.

N. B.—Send for catalogue and prices.

FIRE-PLACE HEATER.

Constructed upon the plan of our Fire On The Hearth Stoves.

The only one perfectly adapted to *Hard & Soft Coal and Wood.*

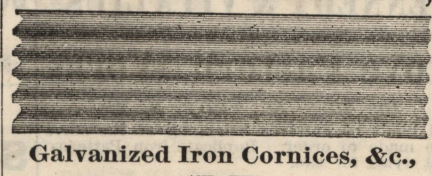
Open Stove Ventilating Co.,
78 Beekman St.
NEW YORK.

Send for descriptive matter.

A. KNISELY & CO.,

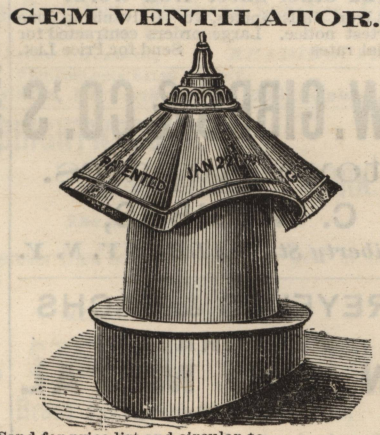
Manufacturers of

CORRUGATED IRON,



Galvanized Iron Cornices, &c.,
AND THE
HAYES SKYLIGHTS (under license).
ROOFING, SLATE, FELT, &c.,
For sale and put on.
72 & 74 W. Monroe Street, CHICAGO.

GEM VENTILATOR.



Send for price list and circular to
GEM VENTILATOR CO.,
5 Mansion House Block, TROY, N. Y.

STOVE LEG REST,

WOOD FILLED,

Nickel Plated.

Carpet, Oil Cloth, Stove Board

Protected from Injury.

Price, 75 Cents per Dozen,

NET CASH.

Manufactured by

Palmer & Skilton

281 Pearl St.,

NEW YORK

THE ROSELLE FACING WORKS,

Roselle, N. J.,

MINERAL, CHARCOAL AND SOAPSTONE FACINGS,

For Stove Plate, Hollow Ware and Machinery Castings.

These Facings are made from BETTER MATERIALS, GROUND FINER, are ALWAYS of UNIFORM QUALITY, and when properly used will make better work than any in the market. Also

SUPERIOR QUALITY PULVERIZED GERMAN LEAD.

Samples and prices on application. **M. F. MOORE, Proprietor.**

STOVE PATTERN

FILING AND FITTING a specialty. Established 1867. Work done by contract or by the day.
ALBERT BROWN,
85 Ferry street, Troy, New York.

MICA

FOR

OIL STOVES.

We are prepared to furnish manufacturers of

OIL STOVES

with best quality

MICA

at low prices.

Let us know sizes wanted and we will quote prices.

J. S. & M. PECKHAM, Utica, N. Y.,
Miners and Wholesale Dealers in Mica.

MICA!

THE CHESTER MICA & PORCELAIN CO.

MICA

Of best quality,
Of all sizes,
Cut to any pattern,
In quantities to suit,
At lowest prices.

No. 87 LIBERTY STREET, NEW YORK.

Assorted Packages North Carolina

MICA.

PREPARED EXPRESSLY FOR THE RETAIL TRADE

2 lb. Package, Containing 8 Sizes,	¼ lb.	2	x5	¼ lb.	4	x5	¼ lb.	5	x7	¼ lb.	3	x5	Price **$6.00**
	"	3	x6	"		2½x4	"	3	x4	"	2½	x5	
3 lb. Package, Containing 12 Sizes	¼ lb.	3	x6	¼ lb.	3	x5	¼ lb.	2½	x3½	¼ lb.	2½	x4½	Price, **$8.5**
	"	2	x5	"	3	x3	"	3½	x4½	"	2	x4	
	"	4	x7	"	4	x5	"	3	x4	"	5	x8	
4 lb. Package, Containing 16 Sizes	¼ lb.	4½	x5½	¼ lb.	3½	x5½	¼ lb.	2	x4	¼ lb.	2½	x3½	Price, **$11.00**
	"	3	x4	"	2	x3	"	5	x7	"	4	x5	
	"	2½	x5½	"	3	x5	"	2½	x4	"	2	x5	
	"	3	x6	"	3	x3	"	3½	x4	"	6	x7	

Above Price Net Cash—No Discount. These Packages Delivered Free to any part of the United States.

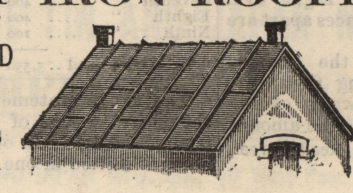
MUNSELL & BROOKS, 115 Beekman st., New York.

GARRY IRON ROOFING CO.,

Manufacturers of all kinds of

IRON ROOFING AND CRIMPED SIDING,

Fire-Proof Doors and Shutters,



Iron Ore Paint and Cement.

79 & 81 Columbus Street CLEVELAND, OHIO.

Send for circulars and price lists.

September 29th, 1879, that may then remain upon our books.

We will enter orders at present prices for immediate shipment only, unless quantity and kind of goods are clearly set forth, and a specified time of delivery is expressly agreed upon.

If our anticipations of a further advance in iron are realized, an advance in the prices of the various goods of our manufacture will become necessary at an early date, and all orders received after an advance has been made will be charged at the advanced prices without further notice.

ISAAC A. SHEPPARD & Co., Philadelphia and Baltimore.
COX, WHITEMAN & COX, Philadelphia.
SHEELER, BUCKWALTER & Co., Royer's Ford, Pa.
SHANTZ & KEELEY, Spring City, Pa., and Philadelphia.
RAYMOND & CAMPBELL, Middletown, Pa.
MARCH, BROWNBACK & Co., Limerick Station, Pa.
THE LEIBRANDT & MCDOWELL STOVE Co., Philadelphia and Baltimore.
THE UNION STOVE AND MFG. Co., Pittston, Pa.
ORR, PAINTER & Co, Reading, Pa.
THOMAS, ROBERTS, STEVENSON & Co., Philadelphia.
CHARLES NOBLE & Co., Philadelphia.
PHILLIPSBURG STOVE WORKS, Phillipsburg, N. J.

December 24, 1879.

From the Pittsburgh Trade.

We are informed by Mr. John B. Herron, secretary of the Stove Manufacturers' Association, of Pittsburgh, that at a meeting held last Tuesday it was resolved that, on account of the recent rapid advance in pig metal and other materials, the discount on their lists would be reduced from 25 to 15 per cent., to take effect January 1st, 1880. We have not yet received their circular.

New Calendars.

N. & G. Taylor Company, Philadelphia, send us a very pretty calendar for 1880, in the center of which is a colored picture representing a home scene in the olden time, and presumably representing the pleasures and advantages, as seen from the inside of the house, of a perfect roof made with "Old Style" redipped leaded plate. In the calendar the holidays are left blank, which is a good idea, as in these busy times some of our tinsmiths would be apt to forget whether the Fourth of July came on the third or fifth in leap year. As they don't find any 4 in the calendar for July, they will be set right.

Messrs. Merchant & Co., Philadelphia, send us a calendar for 1880 in the shape of a little book of eight pages, four of which are occupied with colored pictures from the presses of Marcus Ward & Co., London. This is more than a calendar, for it gives the moon's phases, legal holidays, church days, eclipses for 1880, and rates of domestic and foreign postage. This little book is almost too pretty for shop use, and is more likely to be found in the corners of looking glass or picture frames at home than over the desk or work bench.

Melting Iron with Coal and Coke in Foundry Cupolas.

BY EDWARD KIRK.

I received several inquires lately from foundry men who have been accustomed to melting with coal as to how many pounds of iron can be melted to the pound of coke, and as to how a cupola should be charged when melting with coke; and from foundry men who have been accustomed to melting with coke I have received the same inquiries about melting with coal. All this information, together with accounts of melting and descriptions of the methods of charging cupolas with coal and coke in various foundries, will be found in my work, "The Founding of Metals,"* and below I give an accurate account of a week's melting done in two of our leading stove manufactories. In each of the statements is given the amount of fuel in the bed, the amount of fuel in each charge, and the amount of iron on the bed and on each charge of fuel. The cupola used by the Excelsior Manufacturing Company is a round one, with a shell 6 feet 2 inches in diameter. It is lined with 8-inch brick to about 12 inches above the tuyeres, and with 6-inch brick from there up. Seventy-two small round tuyeres arranged in four superposed rows are used in this cupola, and are supplied with air from an air chamber surrounding the cupola. The cupola used by Rathbone, Sard & Co. is a round one, with a shell 6 feet in diameter, lined with 6-inch brick from the bottom up. Eight oval tuyeres arranged at equal distances apart are employed in this cupola.

Melting done with coke at the foundry of the Excelsior Manufacturing Company, at St. Louis, Mo., for the week ending Augut 25, 1877. Table showing the amount of coke required to melt iron and their mode of charging the cupola when melting with coke. In these heats 40 pounds of coke are counted to the bushel and the coke was the best Connellsville.

Date. 1877.	No. of chges.	Bush Coke to charge.	Total Bushels Coke	Lbs. Iron to ch arge.	Total Lbs. Iron.
Aug. 20.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,050	12200
	17		149		51,200
Aug. 21.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3.250	13,000
	17		149		52,000
Aug. 22.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,000	12,000
	1	10	10	4,300	4,300
	18		159		55,300
Aug. 23.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	6	7	42	2,900	17,400
	19	..	163	.....	56,400
Aug. 24.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	6	6⅔	40	2,733	16,400
	19	..	161	.....	55,400
Aug. 25.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,375	13,500
	17	..	149	.....	52,500

NOTE.—The first charge in each table is the bed charge.

Melting done with Lehigh coal at the foundry of Rathbone, Sard & Co., at Albany, N. Y., for the week ending Sept. 6, 1877. Table showing the amount of coal required to melt iron and their mode of charging the cupola when melting with coal:

August 31, 1877.

	Lbs.		Lbs.
Coal in bed.....	2,400	Iron on bed.....	7,200
First charge coal...	400	Second charge iron	3,600
Second "	250	Third " ..	3,600
Third "	400	Fourth " ..	3,600
Fourth "	400	Fifth " ..	3,600
Fifth "	400	Sixth " ..	3,600
Sixth "	400	Seventh " ..	3,600
Seventh "	400	Eighth " ..	3.600
Eighth "	400	Ninth " ..	3,600
Ninth "	100	Tenth " ..	1,000
Total coal used...	5,550	Total iron melted.	37,000

September 1, 1877.

Coal in bed.....	2,400	Iron on bed.....	7,200
First charge coal...	400	Second charge iron	3,600
Second "	250	Third " ..	3,600
Third "	400	Fourth " ..	3,600
Fourth "	400	Fifth " ..	3,600
Fifth "	400	Sixth " ..	3,600
Sixth "	400	Seventh " ..	3,600
Seventh "	400	Eighth " ..	3,600
Eighth "	400	Ninth " ..	3,600
Ninth "	100	Tenth " ..	1,000
Total coal used...	5,550	Total iron melted.	37,000

September 3, 1877.

Coal in bed.....	2,400	Iron on bed.....	7,200
First charge coal...	400	Second charge iron	3,600
Second "	250	Third " ..	3,600
Third "	400	Fourth " ..	3,600
Fourth "	400	Fifth " ..	3,600
Fifth "	400	Sixth " ..	3,600
Sixth "	400	Seventh " ..	3,600
Seventh "	400	Eighth " ..	3,600
Eighth "	400	Ninth " ..	3,600
Total coal used...	5,450	Total iron melted.	36,000

September 4, 1877.

Coal in bed.....	2,400	Iron on bed	7,200
First charge coal...	400	Second charge iron	3,600
Second "	250	Third " ..	3,600
Third "	400	Fourth " ..	3,600
Fourth "	400	Fifth " ..	3,600
Fifth "	400	Sixth " ..	3,600
Sixth "	400	Seventh " ..	3,600
Seventh "	400	Eighth " ..	3,600
Eighth "	400	Ninth " ..	3,600
Total coal used...	5,450	Total iron melted.	36,000

September 5, 1877.

Coal in bed	2,400	Iron on bed	7,200
First charge coal ..	400	Second charge iron	3,600
Second "	250	Third " ..	3,600
Third "	400	Fourth " ..	3,600
Fourth "	400	Fifth " ..	3,600
Fifth "	400	Sixth " ..	3,600
Sixth "	400	Seventh " ..	3,600
Seventh "	400	Eighth " ..	3,600
Eighth " .	400	Ninth " ..	3,600
Ninth "	100	Tenth " ..	400
Total coal used ..	5,550	Total iron melted.	36,400

September 6, 1877.

Coal in bed	2,400	Iron on bed	7,200
First charge coal ..	400	Second charge iron	3,600
Second "	250	Third " ..	3,600
Third " ...	400	Fourth " ..	3,600
Fourth "	400	Fifth " ..	3,600
Fifth "	400	Sixth " ..	3,600
Sixth " ...	400	Seventh " ..	3,600
Seventh "	400	Eighth " ..	3,600
Eighth "	400	Ninth " ..	3,600
Ninth "	100	Tenth " ..	400
Total coal used ..	5,550	Total iron melted.	36,400

The above statement does not represent the entire amount of iron melted by Rathbone, Sard & Co. in one week, but only the amount melted in one of their cupolas.

* Published by David Williams, 83 Reade Street, New York. Price $2,50

M. D. LEGGETT, Ex-Commissioner of Patents L. L. LEGGETT.

M. D. Leggett & Co., Patents & Patent Law, City Hall Building, Cleve'd O.

EXCELSIOR STOVE WORKS

MANUFACTURE

"Excelsior Cook," "Monumental Cook," "Enterprise Cook," "All Right Cook," all A. 1.

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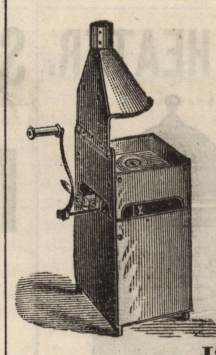

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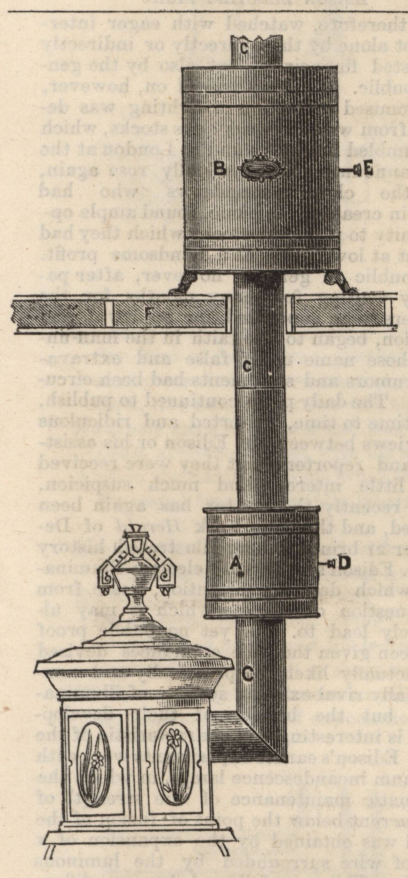

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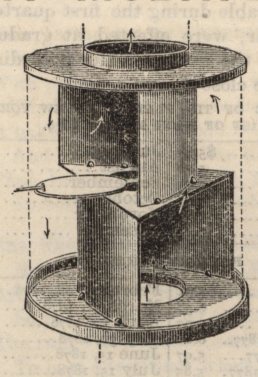

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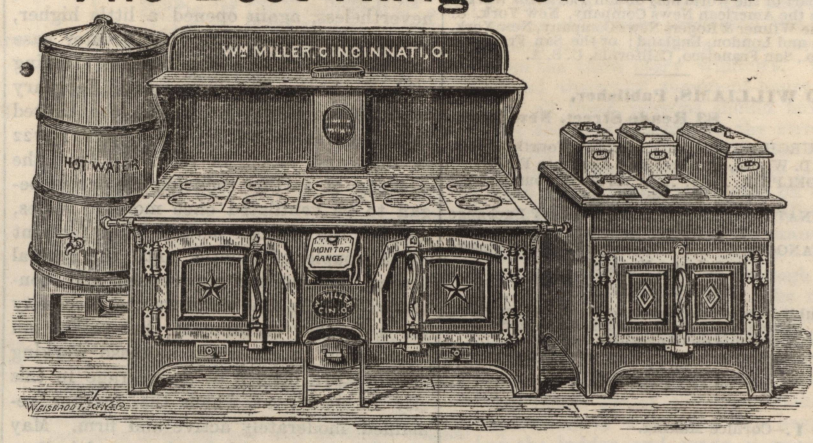

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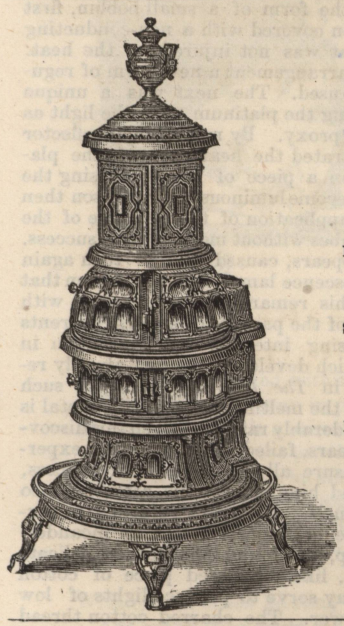

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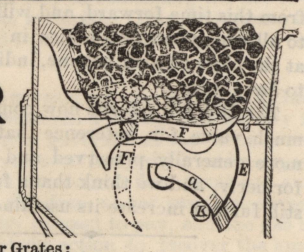
Improved, 1879.



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PLAIN, STAMPED & JAPANNED WARE,

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THE METAL WORKER AND Stove & Tin-Trade Journal WITH WHICH IS INCORPORATED THE SHEET-METAL BUILDER

New York, Saturday, January 3, 1880.

DAVID WILLIAMS - Publisher and Proprietor
JAMES C. BAYLES - Editor.
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BRITISH AGENCY.

The publishers of *The Ironmonger*, 44a Cannon street, London, England, will receive orders for subscriptions and advertisements on our regular terms.

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We have lately received so many letters asking us to publish an index for *The Metal Worker*, that we have decided to begin publishing such an index for each volume from this time forward. It is not likely that there are enough complete files of *The Metal Worker* in the hands of subscribers to justify the very considerable cost of publishing an index from the first; but we shall do so from this time forward, and will send copies to all who, upon due notice in our columns at the close of each volume, indicate a desire to have them.

The Metal Worker is now considered of so much value for reference that it is much more generally preserved and bound than formerly, and we think that a full index will still further increase its usefulness.

We publish this week the first part of a valuable paper by Mr. William J. Keep, C. E., on some of the laws of heat in their relation to stove manufacture, which should be carefully read. It is elementary, but none the less useful on that account, for there is no better preparation for investigation and experiment than a thorough study of the elements of the department of physical science in which the investigations are to be conducted. We welcome such valuable assistance from one so well able to render it. The Editor also presents, with his compliments, a tardy contribution to the fun of the holiday season, in the shape of another of his Stove Trade Ballads, which was intended for last week's issue, and would then have appeared but for a delay in getting the cuts made. He can only plead in extenuation of some of the rhymes that he does not do it often, and that he is able to prove a good general literary character by at least a dozen witnesses. There are also some mitigating circumstances which perhaps may be allowed to have weight in his favor. He therefore pleads guilty and throws himself on the mercy of his readers.

Tin Plates.

The course of the tin plate market during the past year has been so remarkable, and the subject has so much practical interest for a large proportion of our readers, that a review of the fluctuations of the past twelve months, with some general remarks thereon, will doubtless be found of interest and value.

Early in January the average price of ordinary Tin Plates was, at New York, $5.33 ℔ box. Ordinary Charcoal commanded 18/6 @ 19/ at Liverpool; ditto Ternes, 17/ @ 18/, and Coke, 16/ @ 16/6. The month was both active and strong, some 10,000 boxes, mostly Coke, selling here in a single week. The demand in England for abroad was on the increase, and the tendency upward. February opened at $5.70 average, while in England the price had improved to 22/ for Charcoal, 18/ for Terne and 17/6 for Coke, to give way about 1/ subsequently. A good many Western orders were received at New York, and when they had been filled a lull ensued. March, nevertheless, again opened a little higher, the average being $5.75, but greater ease soon followed, with a simultaneous slacking off in England. The January and February export from Great Britain to the United States aggregated 18,132 tons, against 15,722 in 1878, and 14,577 in 1877. In April the question of further reducing the output began to be ventilated once more in Wales, keeping the English market in a ferment for a couple of months, until the revival toward midsummer supervened and convinced makers that there was no necessity for a further curtailment, but rather an inducement to gradually increase working days. April opened at an average in this city of $5.67, at which the market remained moderately active and firm. May was ushered in with an improved feeling, and an average of $5.66, but the dealings were not large, the dull season making itself felt by degrees. In England a torpid state of affairs was noticeable, makers upholding the price of 16/6 for Coke with difficulty. To some extent it was suspected that the depression at New York had been the work of speculators bent upon keeping prices down. Meanwhile, the pressure to sell increased in England also. The shipments from Liverpool to American ports during the first four months had been 604,340 boxes, against 481,783 in 1878, 534,164 in 1877, and 465,162 in 1876. From the United Kingdom shipments to all quarters aggregated 57,758 tons, against 47,707 in 1878, and 48,257 in 1877; of these to the United States alone 44,226 tons, against 32,998 and 32,565 respectively. June opened here at an average of $5.43, and a decidedly improved feeling in response to a similar one on the other side. A fair amount of business was transacted during the month. The shipments from the United Kingdom to the United States during the first five months proved to have been 56,001 tons, against 41,992 in 1878, and 43,037 in 1877. July opened with a buoyant tone, at the average of $5.50, the demand running principally on Ternes for roofing purposes, while Coke Tin was neglected. A good deal was also done deliverable in three months. In Wales four days' work were agreed upon. Meanwhile Coke had dropped, during a dull spell, to 15/6 in Liverpool, whence the shipments, during the first six months, to American ports had been 870,000 boxes, against 807,345 in 1878. From the United Kingdom to all quarters they had been 91,224 tons, against 76,324 in 1878, and 77,233 in 1877; of these there went to the United States, alone in 1879, 68,780 tons, equal to 1,350,000 boxes.

Considering the season, August was inaugurated with a very good demand indeed, and at an average here of $5.40, certainly a very low price, well calculated to attract buyers. In England an advance of 1/ took place, Coke being worth 16/ @ 16/6. The shipments from Liverpool to American ports during the first seven months were 1,011,315 boxes, against 927,191 in 1878, 951,047 in 1877 and 803,448 in 1876; from Great Britain to the United States, 81,860 tons, against 62,476 and 61,857, an increase of something like 31 %. September developed increased activity, opening at $5.57 average. The demand was general and well sustained. Middle of September makers in Wales resolved to work five days. The tendency in England had become a decidedly upward one in consequence of the important advance in Block Tin and Pig Iron. In spite of the enormous shipments this way, October opened with quite a light stock at New York, and an average of $6.66. While the month progressed the demand from the trade, consumers and speculators was becoming a more and more pressing one, and after a while a wild state of affairs prevailed, Tin Plates catching the contagion of the general mania, which had temporarily seized upon the commercial classes on this side. Toward the close of the month, while the speculative demand subsided, and the trade demand increased. Deliveries from the other side remained very much backward. In England, under the impulse of the news from here, an important advance took place, Charcoal rising from 23/ @ 24/ to 28/ @ 30/, and Coke from 20/ to 24/ @ 25/. November opened in a more quiet mood in this city, with an average price for ordinary brands of $7.28. Speculation had disappeared for the time being, but the consumptive demand remained all that could be wished for, causing holders not to press their goods on the market, thus maintaining the latter moderately active, but firm. Work in England was now four days per week, with a probability of full work on Jan. 1 in prospect. Prices there declined to 27/6 @ 28/6 for Charcoal and 24/ for Coke. The market remained active in December; large sales, deliverable during the first quarter of the new year, were effected at gradually rising prices, the average value of ordinary brands at the close being $7.50.

AVERAGE PRICE OF TIN PLATES AT NEW YORK ON THE 1ST OF EACH MONTH, 1879.

January	$5.33	July	$5.50
February	5.70	August	5.40
March	5.75	September	5.57
April	5.67	October	6.66
May	5.66	November	7.28
June	5.43	December	7.11

PREVIOUS PRICES.

July 1, 1874	$8.71	February 28, 1878.	$5.66
April 28, 1876	6.58	March 31, 1878	5.66
May 5, 1877	5.97	April 30, 1878	5.72
September 7, 1877	6.00	May 31, 1878	5.37
October 19, 1877	5.97	June 15, 1878	5.35
December 20, 1877.	5.85	July 15, 1878	5.33
December 31, 1877.	5.77	October 3, 1878	5.18
January 1, 1878	5.75	December 18, 1878.	5.28

The import of Tin Plates into the United States during the first ten months was 123,043 tons, against 88,985 during the corresponding period of 1878, and the export 169 tons, against 716.

What Does Gas Cost?

Some one has been investigating the subject of the net cost of gas. In regard to it we have the following, apparently from a writer in St. Louis:

It would really be a satisfaction to know how much it costs to make a good quality of gas. The average price at which gas is sold throughout the United States is $3.87 per thousand. In Wheeling, W. Va., where gas is furnished by the city at cost, the price is fixed at $1.20 per thousand. In Pittsburgh two rival companies are furnishing it at $1 per thousand. The official reports of the Philadelphia Gas Company, run under municipal management, show that it costs $1.90 per thousand. In Louisville it costs $1.42 per thousand to deliver, and the company charges $2.35, which, it is claimed, does not pay 8 per cent. on the capital invested. Mr. Socrates Newman, receiver of the St. Louis Gas-light Company, says in one of his reports that the average cost is $1.70 per thousand, and that, if the company were to furnish it at $2.50 per thousand, it would not make 5 per cent. of the appraised value of its works. The Metropolitan Gas Company, of London, furnishes gas at 72 cents per thousand, and at the same time pays 10 per cent. dividends. The Cincinnati Gas Company offers to furnish gas at $1.75 per thousand, but the Board of Aldermen has just adopted a report fixing the price at $1.25. In St. Louis we now pay $2.50, and if the gas company should have their property returned to them under the late decision of the Supreme Court, we may expect an increase in the price. Possibly Mr. Edison will come in with his electric apparatus and settle this question by giving us a better light for about 10 cents per thousand.

No doubt all these high cost prices are accurate if the present consumption is taken as a basis. But gas engineers forget that at a lower price the consumption could be increased to an almost unlimited extent. It would probably be found then that there was a very large margin. In other words, a great many of these people who are arguing that gas cannot be brought down in price, entirely forget the influence which an increased product has upon the cost of the manufacture.

SCIENTIFIC AND TECHNICAL.

From an article in the *Engineer* it would appear that the

WOOD-CENTERED CAR WHEELS

which are used in very large numbers for the passenger cars of English and Continental railways, have been found unequal to the duty enforced upon them by the higher strains due to the use of continuous brakes. Mr. Cleminson, an English engineer, has sought to render them fit for service under existing circumstances by changing both the construction of the nave and the bars. The latter is now made with a number of arms extending to within a short distance of the tire, which do not prevent a close fitting of the wooden segments. He has also improved the ordinary method of tire fastening by having the tire formed with a groove for the retaining ring. The main advantages claimed for wooden centered wheels are a decreased wear of axle and tire, claims which seem to be borne out by comparative experiments made in French and German woods.

When, about a year since, Prof. Thomas Alva Edison, "the Wizard of Menlo Park, N. J.," was understood to have found the solution of the problem of producing a low-power, cheap electric light, the public was prepared to accept the assertions of those who claimed to speak for him with much faith. He was entitled to more than a respectful hearing, as the man who had invented the quadruple telegraph system, a telephone and the phonograph. The wonderful simplicity of the two latter apparatus, and the remarkable results obtained, were due to originality and daring in invention, which undoubtedly place him in the ranks of the great inventors of this century. Developments in regard to the

EDISON ELECTRIC LIGHT

were, therefore, watched with eager interest, not alone by those directly or indirectly interested financially, but also by the general public. As time passed on, however, the promised revolution in lighting was delayed from week to week; gas stocks, which had tumbled both here and in London at the first announcement, gradually rose again, and the clever speculators who had aided in creating the panic, found ample opportunity to place the stocks which they had bought at low figures at a handsome profit. The public in general, however, after patiently waiting for many months for the wonders to be submitted for approval and adoption, began to lose faith in the man under whose name many false and extravagant rumors and statements had been circulated. The daily press continued to publish, from time to time, distorted and ridiculous interviews between Mr. Edison or his assistants and reporters, but they were received with little interest and much suspicion. Quite recently the matter has again been revived, and the New York *Herald* of December 21 brings a long illustrated history of Mr. Edison's work with electric illumination which deserves attention, aside from any question of success which it may ultimately lead to. As yet no public proof has been given that the appliances devised are actually likely to practically and commercially rival existing systems of illumination, but the history of their development is interesting and characteristic of the man. Edison's earlier experiments were with platinum incandescence lamps, in which the automatic maintenance of the strength of the current below the point of fusion of the metal was obtained by the expansion of a rod of wire surrounded by the luminous spirals. This was followed by a modification, the regulation of the current being effected by the movements of a diaphragm acted upon by gas or air inclosed in a vessel and heated by the proximity of the light. After this came a device for obtaining more light-giving surface, the platinum being wound in the form of a small bobbin, first having been covered with a non-conducting coating that was not injured by the heat. With this arrangement a new form of regulator was used. The next was a unique idea, making the platinum give the light as it were by proxy. By means of a reflector he concentrated the heat rays of the platinum upon a piece of zircon, causing the latter to become luminous. Mr. Edison then tried the application of the principle of the Geissler tubes without meeting with success. This, it appears, caused him to turn again to incandescence lamps, and it was then that he made his remarkable experiments with the effect of the passage of electric currents of increasing intensity upon platinum in vacuo, which developed the fact already referred to in *The Iron Age*, that by such treatment the melting point of the metal is very considerably raised. Even this discovery, it appears, failed in the inventor's experience to insure all the elements of success, and we find him turning his attention into new channels. He again returned to carbon as the best material for an incandescence lamp, and found that the most delicate structures, like a charred piece of cotton thread, may serve to produce lights of low candle power. The charred cotton thread or strip of carbonized paper, of horseshoe shape, is inclosed in a little glass globe from which the air is exhausted by means of a vacuum pump and sealed, the wires leading to the dynamo electric machine being attached to each end of the carbon strip or arc. The extreme simplicity of this apparatus and its low cost, certainly meets one of the most important requirements essential to success. How it will stand the test of working beyond the duration of a few days or weeks, and whether it will prove to be able to do what is actually claimed for it, are questions which actual experience and purely authenticated tests alone can prove. Until they have been made we must rest content with admiring Mr. Edison's versatility and his fertility of resource.

The Bedeviled Range.

A Tale of Housekeeping Experience.

BY J. C. BAYLES.

One day the Devil came on earth—
  No doubt to find some occupation
For idle hands, which, proverbs say,
  Is Satan's favorite vocation;
And, as he wandered to and fro,
  Intent on mischief, he decided
To see what could be done within
  The house where Deacon Lamb resided.

Now, in the town there was not one
  So truly good as this same deacon.
He lived a life beyond reproach
  And let his light shine like a beacon.
E'en Parson Bellows chose his texts,
  'Tis said, at Brother Lamb's dictation,
And ne'er a gossip criticised
  His daily walk and conversation.

He neither smoked nor chewed, nor knew
  One kind of liquor from another,
And if you asked him which was which,
  He'd, like as not, say one was t'other.
He freely gave to church and poor,
  Dealt always squarely with his neighbors,
And on the Sabbath, come what would,
  He rested from all worldly labors.

Long had the Devil watched with pain
  This pious deacon's blameless living,
His honest dealing and his way
  Of cheerful, charitable giving;
And often had he ground his teeth
  And switched his tail in sheer vexation,
That, as regards the deacon's soul,
  He had no grounds of expectation.

Now, when he looked within the house
  Where this good man in peace resided,
He found that with a servant girl
  The family was not provided.
So, quick as thought, he changed his shape;
  Horns, hoofs and tail securely hid he,
And donned a pull-back, *a la mode*,
  To personate an Irish Biddy.

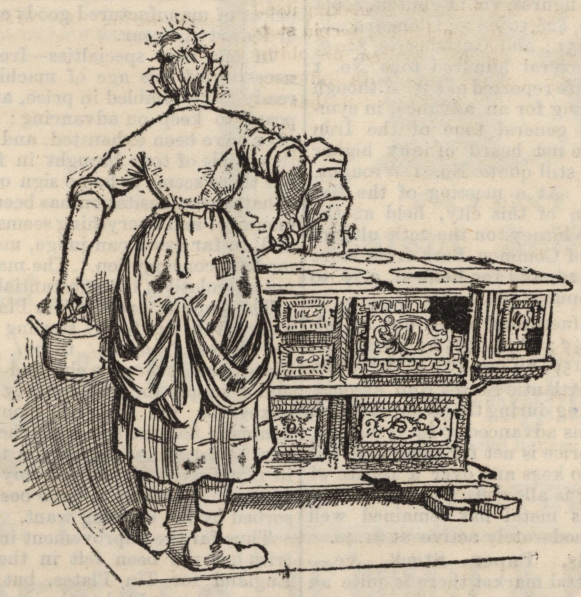
With brazen cheek he rang the bell
  And asked if he could see the lady,
And being told to step within,
  A regulation curtsy made he.
"Plaze, mum," said he, "me cousin said
  That fur a gur-ril yees waz lookin';
For gineral housework, sure, it waz—
  To wash and iron and do the cookin'.

"And as I had no place mesel',
  Sure, thinks sez I, there's no harm goin'
To see the lady, aiven if
  She's got a gur-ril, me not knowin'.
I've had twilve dollars and a half,
  But times is haard, so I waz thinkin'
That mebby tin wad be anuff,
  As I don't spind a cint for drinkin'."

Kind Mrs. Lamb was "took aback,"
  By such an unexpected statement;
For ne'er before had female "help"
  Proposed in wages an abatement;
And making up her so-called mind
  That this young woman was "a treasure,"
She straight engaged her *sine die*,
  And gave her two nights out with pleasure.

Now, in the deacon's kitchen stood
  A range, of which he did much boasting.
With proper management, it was
  The boss for baking or for roasting.
It baked the weekly batch of bread
  And pies with less than half the fuel
That, in a common range, you'd need
  To boil a saucepan full of gruel.

But, like most ranges (which, to quote
  My old friend Filley, of Missouri,
Are but "spoiled cook stoves built with flues,
  So poor you couldn't make them poorer"),
The range at Deacon Lamb's would work
  To best advantage when well tended,
And in the hands of Mrs. Lamb
  It certainly had acted splendid.



Now, when the Devil was installed
  As maid of all-work in the kitchen,
He spied this range, and laughed so hard
  And long his side he got a stitch in.
"Ha, ha! by all that's wrong, ho, ho!
  Despite his sanctimonious bearing,
Before a month is out, he, he!
  I'll have this pious deacon swearing."

The way he went to work was this:
  He used a hod of coals to stoke it,
And when the fire was dull and slow
  He lifted off the lids to poke it.
He always kept the dampers wrong,
  The check he *would* forget to shove in,
And baking days you had your choice
  Between an ice box and the oven.

A turkey stuffed and set to roast
  Would catch a cold without his feathers,
But loaves of bread were sure to turn
  As black on top as patent leathers.
Breakfast was never prompt, which made
  The deacon late at store and meeting;
But go at midnight and you'd find
  The range red hot and still a-heating.

The linings lasted just a week;
  The grate was melted down like butter,
And plates were broken at a rate
  Which put the deacon in a flutter.
Six times he had the range repaired,
  And daily showed the way to use it;
But, watch him with what care they would,
  Somehow the Devil would abuse it.

One day the deacon, having lost
  All patience with the stupid servant,
Hied to the kitchen for a chance
  To speak to her in language fervent.
When, lo! he found the grate was down
  In scraps, and further to harass him,
The Biddy, ere he'd time to say
  The half he thought, began to "sass" him:

"Nice paaple, sure, yeez thinks yersels,
  To have a range that's spiled wid rustin',
And thin expect to kape a cook
  For two old hogs that aits to bustin'."
The deacon's face grew very red,
  His hair stood up, his eyes turned green like,
And, when he found his voice, his wrath
  Exploded, nitro-glycerine like.

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[It is not deemed expedient to print the deacon's remarks, especially as those who find themselves in a similar position enjoy a peculiar satisfaction in inventing new and strikingly original phrases, which is much greater than that derived from the use of a ritual, so to speak.]

The deed was done—the pious man
  Had yielded to the sore temptation,

And—not to speak of something worse—
  Had jeopardized his church relation,
The devil danced with mad delight,
  And made a dive his native gulf for,
But left behind his woman's clothes—
  And an unpleasant smell of sulphur.

Good friends, my nonsense may not seem
  A second sober thought to merit;
But if you suffer like the Lambs,
  And find it *very* hard to bear it,
Don't curse the man who made your stove,
  And to the dealer do not pitch in,
Until you've exorcised the fiend
  Who "plays the devil" in your kitchen.

Fire Escapes and Stairs in Tenement Houses.

Every tenement house must be supplied, under the requirements of the law, with permanent fire escapes sufficient to furnish effective means of egress for all persons who dwell in the upper stories, and the iron ladders which mount from story to story on the street front of so many of these houses are made to meet this need. But they do not meet it. They are an inadequate protection to the persons whom it was intended to protect when the law was made. The house in Cannon street, the scene of a recent tenement-house tragedy in this city, was supplied with a set of these iron ladders. Yet four persons were suffocated on the fourth story, two were killed in attempts to jump to the street, and only an almost miraculous chance prevented the additional deaths of the children who were thrown from the third story windows. Under the official theory of tenement-house construction all these persons should have had an easy and safe descent to the street. Why was the ladder useless on this occasion? No details will ever be known, we presume, of what passed in the apartment on the fourth story, since not one remains alive of those who lived there, and so it cannot be said that they tried the fire escape. They may have been unable to get through the dense clouds of smoke that filled the room they would have had to cross to reach it. But this much is known—the iron rungs of the ladder were red hot, for a fireman who tried to go up by it found them so. The rush of the flames out of the rear windows of the apartment in which the fire began played on the ladder and made it worthless as a means of escape.

These contrivances are placed where they are in order to facilitate ready and immediate access to them from the apartments on each floor; but the fact of their proximity to the windows—that is, to one of the loopholes though which the flame rushes in every fire—tends to prevent access to them and to make them useless by heating the iron. Other more effective plans must be tried to prevent these horrible deaths, and one of the simplest and cheapest would be to supply our Fire Department with effective movable fire escapes. These are in regular use in London. But the best plan is to compel the adoption of a special structure for staircases in tenement houses. All stairways in such houses should be constructed of stone or brick. This should be made by law as indispensable as brick or stone for chimneys. It is a great many years since the erection of frame houses in this city was forbidden by law, but houses are now but little less combustible than they were before that change, because that law has changed only the material of the shell of every fabric. All the beams, floors, joiner's work and stairways are of the most highly inflammable material. Therefore the purpose for which that law was made is not accomplished by its requirements, and it is time to take a further step in compelling the use of incombustible material. This step should be with regard to stairways as suggested.

A few years ago the Pittsburgh Gas Company rendered a bill against the city for the amount of government tax at the rate of 25 cents per 1000 feet, which said company had paid on 12,000,000 feet furnished annually to the city free, as per previous agreement. The city refused to pay, and the gas company brought action to recover the amount—about $12,000. The case was decided against the plaintiff company in the Court of Common Pleas, and was taken up to the Supreme Court, where the decision of the court below was affirmed. It was then taken to the United States Supreme Court, resulting in the following decision: In the case of the Pittsburgh Gas Company, plaintiff in error, *vs.* the city of Pittsburgh, error to the Supreme Court of Pennsylvania, in the United States Supreme Court, say: "Section 94, Internal Revenue Act of 1864, levying taxes on illuminating gas, to be paid by the manufacturer, says: 'All gas companies whose price is fixed by law are authorized to add the tax imposed to the price per 1000 feet on gas sold, and all such companies which have heretofore contracted to furnish gas to municipal corporations are, in like manner, authorized to add such tax to such contract price.'" This, in the opinion of the court, does not make a municipal corporation liable for tax in a case where a gas company, for a valuable consideration, contracts to furnish the corporation with gas free of charge. The judgment of the lower court is affirmed, with costs.

Office of THE METAL WORKER,
SATURDAY MORNING, January 3, 1880.

Antimony—Has been moving off steadily within the range of 16¢ @ 20¢, as to quantity and brand.

Coal.—The trade during the past week has undergone very little change, so little in fact as to make it hardly worth noticing. The tonnage for the week is somewhat smaller than it was last week. This is owing to the fact that some of the companies have suspended work for the time being, while others have curtailed their production to a certain extent. There is no inquiry for Coal, the few buyers that come into the market are those who must have Coal for some reason or other. Those who can wait do so. Dealers do not like to make quotations, and we find it very difficult to get any prices which are anywhere near the actual selling figures. There are circulars, but they are so far from representing the actual market prices that their publication seems absurd. The Philadelphia and Reading, it would seem, wish to make it appear that there is an advance, or that they have advanced the price of their Coals. So far as we can hear, the actual asking price is from $3.40 @ $3.50 for Lehigh Stove. Softer Coals were quoted yesterday at $3.25 @ $3.30 for the time being, but no one could be found who was willing to make a quotation for publication, or one that would be good for 24 hours. The truth of the matter seems to be that each one is selling for as much as he thinks he can get from his customer, ready at any moment to "meet the market" in case there appears to be any difficulty in closing the bargain. The continued warm weather has made the retail trade dull, and prevented the working off of stocks.

Copper.—Our market has remained uniformly quiescent during the last week of the year, sales of Lake Superior being restricted to 100,000 lb at 21⅜¢ @ 21½¢, the closing figure, also the nominal quotation for Baltimore. London has varied little; the cable quotes at the close Chili Bars, £67, and Best Selected, £73. Manufactures of Copper are unaltered.

Hardware.—In sympathy with the upward tendency of the Iron market, the prices of Hardware have again become unsettled, and the market may fairly be said to be in a feverish condition.

Among the important changes in Hardware values announced during the week is a further advance in the price of Locks, Knobs, Escutcheons, Keys, &c., to discount 45 per cent.

The American Screw Co. have issued the following circulars:

PROVIDENCE, January 1, 1880.

To the Hardware Trade.—GENTLEMEN: We beg to advise you that we have advanced the prices on our Patent Gimlet Pointed Wood Screws, and now quote as follows:

	Per cent. discount from list.
Flat Head Iron	45
" Brass	30
Round Head Iron	30
" Brass	15

Terms, cash 30 days from date of invoice.

Soliciting a continuance of your orders, we remain, yours truly,

AMERICAN SCREW CO.

PROVIDENCE, January 1, 1880.

To the Hardware Trade.—Following the advance in the price of Iron, we have, in common with the other Rivet manufacturers, this day advanced our prices on Rivets and Burrs, as per quotations below.

Withdrawing and cancelling previous quotations at variance from following, we at present quote on goods in stock:

	Dis. per cent. from List Prices.
Iron Black, Iron Tinned, Block and Carriage Rivets	40
Rivets in Bulk	20
Burrs	20
Philadelphia Pattern Tire Bolts, New Philadelphia List	65
Bay State Tire Bolts, Common List	80
Flat Head Iron Machine Screws	65
Round " " "	60
Flat Brass Head " "	35
Round " " "	20
Taps for Machine Screws	45
Stove Bolts	40
Sink Bolts	40
Pointed Wires	50
Tapped Nuts	25
Hand Rail Screws	40&10
Coach Screws, (by the Keg 150 lbs.)	55

With special additional discounts for large quantities.

Terms, cash 30 days. Freight prepaid to New York, Boston, Philadelphia and Baltimore; and on Rivets, to principal points on or east of Mississippi River. Except on Rivets, freight is not prepaid to other cities than above mentioned, but will not exceed rates from New York city. Prices not guaranteed, and orders are accepted subject to rates ruling at time of shipment.

Soliciting your orders, which shall have our best attention, we remain, yours very respectfully, AMERICAN SCREW CO.

The Lalance & Grosjean Manufacturing Company, in the following communication, show some comparisons of prices of Stamped Tinware in 1860, when such staple goods as are named were considered cheap, with the figures now ruling.

Office of the LALANCE & GROSJEAN MFG. CO.,
19 Cliff Street, NEW YORK, Dec. 29, 1879.

To the Editor of The Iron Age.—DEAR SIR: It will doubtless surprise many of your readers to know that staple goods, like cooking vessels (to be found in every household) which are pressed from sheet iron or tin plate, were much higher-priced in 1860—one year before the war—than they are to-day.

We have carefully looked into the matter, and find by close comparison that, in spite of the late advance in metals, there is scarcely an article in the line of Deep Stamped Ware that was furnished before the war that is not offered by us, or any member of the Stamped Ware Manufacturers' Association of the United States, at fully 25 per cent. less price, and very many articles of much greater difference; for example, Dish Pans, in 1860, were fully 100 per cent. higher than now; Stew Pans, 60 per cent.; Wash Basins, Drinking Cups, Preserving Kettles and Fry Pans, 50 per cent.; Scoops and Dippers, 30 per cent.; Ladles, Skimmers, Cake Turners, and in fact all other articles in the Deep Stamped Ware line, we find will average 25 per cent.

Respectfully yours,
LALANCE & GROSJEAN MFG. CO.
J. C. Milligan, V. P.

Iron.—For Forge Iron the demand continues very active, and prices of all descriptions have been further advanced. We hear of sales of 5000 tons Thomas Gray Forge at $31, and of 3000 tons, brand not named, at the same price. Sales amounting to several hundred tons of No. 1 Foundry Iron have been made during the week at $34.50, and we hear rumors of transactions at $35, but are not able to trace them. Enough business at these high figures has been done, however, to establish a much higher range of prices than was current a week ago, and we quote on a very firm market as follows: Foundry No. 1, $34 @ $35; Foundry No. 2 X, $32 @ $33; Gray Forge, $31 @ $33. Sales are reported during the week of 500 tons Glengarnock, 400 tons Gartsherrie and 200 tons Eglington on private terms, besides sundry small lots said to be at very full figures. The arrivals of foreign Iron at this port since our last writing amount to about 3000 tons but it is difficult to ascertain how much of it is Scotch, as English Pig has been arriving pretty freely of late, and the brands are not classified in the reports. The market has gained strength and we quote a shade higher than last week's figures, viz.: Eglinton, $28@$29; Summerlee, $28.50@$29; Glengarnock, $30; Coltness, $31; and Gartsherrie, $29 @ $30. Sales of several hundred tons No. 1 Wrought Scrap are reported at $35. Although holders are looking for an advance, in sympathy with the general tone of the Iron market, we have not heard of any higher quotations, and still quote No. 1 Wrought, from yard, $35. At a meeting of the Bar Iron Association of this city, held at the office of A. R. Whitney, on the 29th ultimo, the base price of Common Bars from store was placed at 3.2¢, and for Refined, 3.7¢ to go into effect January 1st.

Lead.—Manufacturers' prices are as follows: Bar, 7½¢; Pipe, 7½¢; Sheet, 8¢; Tin-lined Pipe, 15¢, all less 10% to the trade.

Nails.—The Atlantic States Nail Association hled a meeting during the week, at which the card rate was advanced to $4.35 for 10d. to 60d. This price is net for small lots, but for orders of 200 kegs and over a rebate of 10 cents per keg is allowed.

Nickel.—This metal has remained well sustained and moderately active at $1.40.

Old Metals, Paper Stock, &c.—In the Old Metal market there is quite an active demand for Iron, but we note no change in prices. The Rag and Paper Stock market is very firm, and an advance in prices is anticipated.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	per lb.	$0.18	@	.19
Copper Bottoms	"	.15½	@	.16½
Yellow Metal	₩ lb	.09	@	.10
Brass, heavy	"	.12	@	.13
Brass, light	"	.08	@	.09
Composition, heavy	"	.15	@	.16
Lead, heavy	"	.04	@	.04½
Tea Lead	"	.04	@	.04¼
Zinc	"	.03½	@	.03¾
Pewter, No. 1	"	.11	@	.12
Pewter, No. 2	"	.07	@	.08
Wrought Iron	per ton	28.00	@	$30.00
Light do	"	16.00	@	18.00
Stove Plate	"	12.50	@	13.50
Machinery do	"	15.00	@	16.00

The prices current for Rags &c., are as follows:

Canvas, Linen	per lb.	3½c.	@	....
White Cotton, New	"	4½c.	@	....
" No. 2	"	2½c.	@	...
White, No. 1	"	5 c.	@	c.
No. 2	"	3 c.	@	c
Seconds	₩ lb.	2 c.	@	2¼c.
Mixed, Woolen	"	2 c.	@	3 c.
Soft, do	"	1¼ c.	@	c.
Mixed Rags	"	2 c.	@	3 c.
Gunny bagging	"	3 c.	@	...
Jute butts	"	2¾c.	@	..
Kentucky bagging	"	2⅞c.	@	..
Book Stock	₩ lb.	2½c.	@	2¾c.
Newspapers	"	1¾c.	@	2 c.
Waste Paper and Scraps	"	¾c.	@	...
Kentucky Bale Rope	"	4 c.	@	....
Tarred Shaking	"	1 c.	@	1¼c
Grass Rope	"	2½c	@	2¾c

Spelter and Zinc.—There has transpired absolutely nothing since our last report. We continue to quote, nominally, Common Domestic Spelter, 6½¢. We quote: Sheet Zinc, 8¼¢ @ 9¢.

Tin.—Activity has been restricted by the dull holiday feeling, and the sales have been of little importance, while the receipts continue ample; We quote Straits, 24¢; English Refined, 23¢; and Banca, 26¢. *Tin Plates* have been active and very firm. We quote I. C. Charcoal, $9.00; I. C. Coke, $8.50; Charcoal Terne, $8.00 @ $8.25, and Coke Terne, $7.50 @ $7.75 per box for prime brands.

Bruce & Cook have issued the following New Year's greeting to their friends in the trade, which is accompanied by a handsome office calendar for 1880.

HAPPY NEW YEAR.

The year 1880 opens before us the "good times" of commercial and industrial prosperity as no longer prospective, but present. Three years of abundant harvest, the last the fullest of all, have overflowed our garners. The wants of Europe have opened ready demand for our surplus. To handle, transport and market this has set every wheel in motion.

The past few years of sore trial and loss have not been fruitless; railroads have been reorganized and economies studied; new adaptations of machinery give greater efficiency to human skill and labor. We are prepared, in this beginning of the new decade, to bring forces of heretofore unequaled vigor to aid us in our commerce.

We have some social lessons also, which well learned will give us both profit and comfort in the future. When disaster overtook us in 1873, men over the sea looked on and scoffed, or pitied the "reckless Americans;" but they with us have been compelled to drink deep the cup of loss and distress in all branches of human effort. Now, with the first return of our awakened industries, we hear the shout of the artizan, and the hum of machinery, in their glad response to our call for supplies. Nations as well as individuals will be kindlier for these lessons of inter-dependence; a competition that damages our neighbor damages ourselves. "All we are brethren."

The revival in business has had a natural effect on prices of material; it may be that these have advanced too rapidly, but when 50,000,000 of people, who have been studying for seven years how to get along with the old things, begin to replace with new; whenfrom 80,000 to 100,000 miles of railroad are looking for construction or repairs, all energies of supply will be taxed, and as the demand is sure to spread over the world, we may reasonably look for a continuance of business activites for a long time to come. We do not believe any serious recession in prices of manufactured goods can be hoped or feared this year.

In our own specialties—Iron, that first necessity of this age of machinery, has already fairly doubled in price, and seems disposed to keep on advancing; our own supplies have been exhausted, and hundreds of thousands of tons brought in from abroad, but there seems to be no sign of oversupply. Whatever of hesitation has been was but momentary, and everything seems to be taken, and, so far as we can judge, mainly into immediate consumption. The main current is not speculative, but substantial.

The same is true in Tin Plates. An advance from 14/ to 25/ sterling in Liverpool for Cokes, from 19/ to 30/ for Charcoal Plates, has scarcely checked the demand, and a supply for this country of 2,565,114 boxes for the first 11 months of 1879, against 1,804,201 boxes for the same time in 1878 and 1,770,524 boxes for the same time in 1877 leaves us without any accumulated stocks. All seems to have been at once absorbed by the uprising want.

Thus far the improvement in other countries has not been felt in the demand on England for Tin Plates, but it must soon come, and be added to the increasing volume from our own country. We look for no lower price in Tin Plates this year. Whatever fluctuations there may be, we are confident the average price must be higher for 1880 than is now ruling. Added to this increase of demand must be an advance in wages; labor must cost more in 1880 than in 1879, for it will cost more to live.

With all this new energy of successful industries in active motion about us, we tender to our friends and patrons, our New Year salutations and good wishes, with the comfortable assurance that not in an indefinite future, but in the glad present, we have a good time, and with such elements of permanence as justify our expectation of a profitable year's business. Our hope for you all is that it may prove so. Industry and economy will still be necessary, but industry and economy have the assurance of a wonderful good providence that they will be paid.

We inclose with this our calendar for 1880; please put it in the most conspicuous place on your desk, that whenever you are in want of any metal, you may think of and send us your order. Your friends,

BRUCE & COOK, 190 Water street.
NEW YORK, January 1, 1880.

Steam Heating in Troy.

A former citizen of Troy, who was not so glad to get away that he saw fit to refrain from going back again, writes as follows to the *Northern Budget* of that city:

It gives an old Trojan much pleasure on revisiting your city to see that the present generation has not lost any of the enterprise that was brought there by its early settlers and founders. To make note of what has been done, therefore, the past dozen years since I was a resident among you would be too great a task. Troy was the second city in the United States (Philadelphia the first) to introduce public water works, and now Troy enterprise and the pluck of those in the steam heating apparatus are to make it the first city to be heated by the Holly steam heating process. In Lockport and Springfield the introduction of steam heating was experimental merely, and not general throughout the city, as in Troy. The owners of the patent have certainly shown pluck in selecting Troy as the starting point—for it would seem to be like sending coals to Newcastle to send heating apparatus to Troy, where the best stoves and heaters in the world are manufactured. I think they have been wise in doing so, for if it succeeds in Troy it will everywhere.

I am willing to risk my reputation as a mechanic as well as a prophet in predicting it as a success. And I may add it will prove one of the greatest luxuries that can be bestowed on your citizens, for they can have their dwellings heated at no greater cost than now, doing away with all smoke, dirt and dust. And as cleanliness tends to godliness you will have a righteous city. I do not wish to interfere with other people's business, but I think your city fathers should have got better terms than they did in making the grant for city steam. It should have been owned and controlled by the city the same as the water works. In the present method of heating over 60 per cent. of the heat in your fuel is wasted. In the steam heating apparatus now put into your city there will not be a loss of 20 per cent. Every citizen would cheerfully pay as much as the old system costs, and even more for the sake of heating his house by the new method, being thus relieved from the dust, work, care and other annoyances of the old method. By controlling the steam heating apparatus, supplying it economically, the city would soon realize from its heating department sufficient revenue to defray a large part of the expenses of the city government, and it would be cheerfully paid by those enjoying the comforts of a clean and well ventilated house.

About 25 years ago, while several gentlemen were discussing the subject of heating the Crystal Palace in New York by a heating apparatus to be located on another block, some of the parties ridiculed the idea of carrying the heat so far. A gentleman of our acquaintance made the remark that coal could be burned at the mines up the Schuylkill and the heat taken to Philadelphia to heat that city with.

PROJECTED BUILDINGS.

New York.

NOTE.—In these lists "o." stands for owner, "b." for builder and "a." for architect.

Plan 949—W. s. 123d st., 138 ft. w Av. A, 12 first-class brown-stone dwellings, 16.8x50, 3 stories and basements, tin roofs and iron cornices; o., M. E. Hawes; a. and b., W. H. Hoover; cost, $5000 each.

Plan 950—S. s. 110th st., 175 ft. e. 3d av., 1 store house, 25x12, 1 story, tin roof; o., Joseph Murray, 315 E. 116th st.; a., J. H. Valentine, 2281 3d av.

Plan 951—326 and 328 Delancy st., 1 brick factory, 24x10, 1 story, tin roof; o., Singer Mfg. Co.; b., C. Severs.

Plan 952—115 W. 24th st., 1 brick stable and dwelling, 25x25, 3 stories, mansard roof on front and flat in rear; o., Henry Maillard, 116 W. 21st st.; a., J. E. Ware; b., J. C. Donnelly, n. e. cor. Lexington and 50th st.; cost, $6000.

Plan 953—S. s. Fairmount av., 75 ft. s. Prospect st., 1 frame stable, 15x28, 1½ stories, shingle roof; o., John Barry, 125th st.; b., S. H. Merritt, 138th street.

Plan 954—225 Rivington st., 1 brick ten't, 25x72, 4 stories, tin roof; o., B. Schaff & Son; cost, $7000.

Plan 955—S. s. 102d st., 100 ft. w. 3d av., 4 brown-stone ten'ts, 25x60, 4 stories, tin roofs; o. and b., Michael Duffy; a., Andrew Spence; cost, $9500 each.

Plan 956—S. s. 102d st., 200 ft. w. 3d av., 5, brown-stone ten'ts, 20x60, 4 stories, tin roofs and, iron cornices; o., Michael Duffy; a., Andrew Spence; cost, 7000.

Plan 957—S. s., 102d st., 300 ft. w. 3d av., 5 first-class brown-stone dwellings, 15x50, 3 stories and basement, tin roof and iron cornice; o., Michael Duffy, 1830 3d av.; a., Andrew Spence, 90 Nassau st.; cost, $6000.

Plan 958—11 King st., 1 brown-stone flat, 28x65 5 stories, tin roof; o., Edward Cunningham; a. Thoin & Wilson; cost, $14,000.

Plan 959—133 W. 51st st., 1 brick stable, 25x100, 2 stories, tin roof and iron cornice; o., Wm. Woodward, Jr.; a. and b., Charles Buck; cost, $9000.

Plan 960—Madison av., s. e. cor. 131st st., 4 first-class brown-stone dwellings, 16.3½x43, 3 stories and basement, tin roofs and iron cornices; o., W. W. Adams; a., Charles Baxter, 3d av.; cost, $8000,

Plan 1297—26 Exchange Place, cor. William st., to build brick ext'n, 13.7x16, 1 story, tin roof and iron frame skylight; o., Del. and Lacka. R. R. Co., on premises; b., S. Griffith.

Plan 1298—14 5th av., to build brick ext'n, 17.3x 21, 4 stories and basement, tin roof; also make internal alterations and adapt building for dwelling; o., Meletta, Paris, France; a., W. H. Hume, 127 Clinton Place.

Plan 1299—85 Spring st., to add 1 story on brick factory and substitute flat tin roof for present peak; o., Wm. A. White & Sons; b., David Wilkie, 239 W. 18th st.

Plan 1300—225 W. 29th st., to repair damage by fire and restore building to its former condition;; o., Mrs. Anna Farrel, on premises; b., John D. Miner, 51 Fulton st.

Plan 1301—57 Crosby st., rear, to repair damage by fire and restore building to its former condition; b., John D. Miner, 51 Fulton st.

ALTERATIONS.

Plan 1295—12 Elm st., to underpin front wall and build vault under side walk for boilers; o., H. W. Green, on premises; a., John Rogers, 84 Nassau st.

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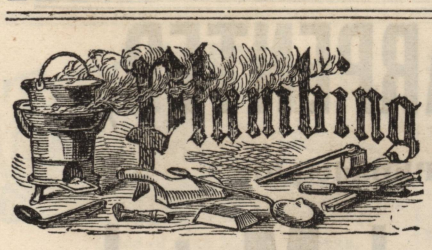


An Important Discovery for the Plumbers.

The very open weather which has prevailed from the commencement of the season usually denominated winter, up to the holidays, affords the "sixth column" man of the *Times* an opportunity to poke some good-natured fun at the much abused, yet withal indispensable, plumber. He writes in a recent article as follows:

"The unexampled mildness of the weather has greatly alarmed the plumbers. Not only have they already suffered a serious loss, but there is every prospect that the winter will be so warm that few, if any, water pipes will be frozen. Moreover, there is a growing conviction that our climate is changing, and that an increasing mildness, winter after winter, will gradually ruin the plumbing business. Signs of retrenchment among plumbers are everywhere visible. A Nineteenth-street plumber recently sold three pairs of carriage horses; a well-known plumber in Fourth avenue has advertised his steam yacht for sale, and another plumber of almost equal notoriety, living in Brooklyn, sold early last week, $3,000,000 worth of railway securities to enable him to pay his grocer's and wine merchant's bills for the last six months."

After reflection, however, he discovers that the situation is not without hope of favorable change. If the winter seasons have become so warm as to deprive the plumber of much of his accustomed harvest, it is possible that nature may yet come to his rescue. If the frost no longer bursts the pipes, why not have a bug or worm to gnaw them, and thus make repairs necessary. The crisis is an important one. Something must be done soon, or all the horses and carriages and yachts, to say nothing of the bonds representing the small savings of years, will have been sacrificed. Nature before this has done as strange things as bringing forth worms having an appetite for lead. Notice one of the arguments:

"When the Atlantic cable, which was cased in gutta percha, was laid, there was no marine animal in existence with a fondness for gutta percha. Nature, however, soon made up this deficiency. The cable had been at the bottom of the Atlantic only two years when a new and very able worm was found to be occupied in gnawing away the gutta percha envelope, and has since multiplied himself and prosecuted his labors with great energy."

Why then is it too much to look forward to the advent of the lead gnawing, lead eating worm? He certainly may be expected to arrive, reasoning altogether by analogy, although the writer signally fails to account for his non-appearance before this time. Probably because he was not needed, the frost doing destruction enough, is the sole reason he has not been at work ever since the second year after lead pipes came into use.

The writer next proceeds to recount the experiments of a certain Prof. Taylor, who is declared to be an eminent Chicago naturalist, with certain marine worms which live in granite rocks. The professor has attempted by artificial means to supply what nature has neglected to furnish. On experimenting he first placed specimens of these marine worms in mud very much diluted, and allowed the mud gradually to dry until finally its inhabitants found themselves, almost without their knowledge, living on the surface of a bed of dry clay and nibbling at pieces of granite with unabated appetite.

The professor next tried the experiment of a change of diet. He ceased to feed the worms with granite, and gave them nothing whatever to eat except pig iron. At first they turned in loathing from this plain, but nutritious food, and in the course of a few months three-fourths of their entire number died of starvation. The day arrived, however, when one of the survivors tasted the despised pig iron, and evidently found it really delicious. This example was soon followed by the others, and at present the whole of Prof. Taylor's collection are apparently voraciously fond of their new diet. Occasionally—especially on Sundays and holidays—they are given pieces of lead pipe, of which they are extremely fond. Thus the professor has succeeded in transforming a marine and granite-eating worm into a land worm, living upon iron and lead. The rapidity with which the confined worms have latterly increased is the most conclusive proof that they thrive in the new circumstances in which they are placed, and we must admit that the professor has added a new species to our list of land invertebrates.

Here is a striking example of the development theory. Flowers and fruits undergo great changes under scientific cultivation, and become acclimated in countries remote from their nativity. Stock breeders frequently obtain marvels in the way of fast horses, sleek cattle and fat swine by judicious crossing in breeding, but very few experiments, we venture to say, have been made with the lower animals, worms and insects, in the way of changing their modes of life and appetites after the fashion of the Chicago professor above recounted. It undoubtedly stands out alone upon the annals of scientific investigation. The result, according to the account before us, is everything that the most ambitious plumber could wish. By the professor's experiments it has been clearly proven that an animal or worm may be propagated which shall furnish him a perpetual harvest season. This new iron and lead-eating worm, as soon as introduced, will fasten upon the water and gas pipes, and leakages will soon make themselves manifest. At all seasons and at all hours pipes will begin to leak, and the plumbers, who are now threatened with ruin by the mildness of the winter, will grow richer than they have hitherto dared to imagine even in their wildest dreams.

It has been announced that the professor is soon to lecture in New York before the Plumbers' and Gas Fitters' Protective Union. The subject of the lecture being this iron and lead eating worm, and the best methods of his introduction and propagation. We learn, however, that the cold wave which has recently struck the city has caused a postponement. The plumbers have suddenly experienced a revival of trade of the old kind, and have requested the professor to postpone his lecture until a more opportune occasion. We shall watch this matter carefully, and, if possible, report the lecture whenever it shall be delivered, in full, for the benefit of our readers.

Report on Philadelphia Sewage.

The Philadelphia *Press* has recently published a very valuable report upon the condition and prospects of sewage in the city of Philadelphia, in which a great deal of valuable general matter is contained. The greater portion of the article is from the pen of Mr. Hering, who is the Assistant Engineer of Philadelphia. Mr. Hering takes the ground that sewers which receive storm water may be made much smaller than is usually considered necessary when their sizes are computed by the ordinary rules. The investigations upon which he bases his opinions have not as yet been made public. From some points in the following article, it would seem that he does not by any means provide for the heaviest storms, but only for the usual rush of water following sharp showers. No doubt much more water could be carried off if sewers were to be treated as pipes, and allowed to carry water under considerable heads. This seems to be suggested, but the plans for doing it are not brought out in the paper, though we understand they are to be published.

IMPORTANCE OF DRAINAGE.

House and street drainage and sewerage is a subject of vital importance to the people of a great city, and yet, singular as it may seem, it is but recently that any attempt has been made to understand it, and it is only within 50 years that any successful efforts have been made to free the large cities of the world from the fatal effects of accumulating filth. Mr. John E. Addicks, the health officer of this city (Philadelphia), who has paid special attention to this subject during the years which he has held that responsible position, was called upon in regard to the subject as applied to this locality, and gave his views, the main points of which are embodied below. Said Mr. Addicks: "The drainage of this city never was good, and the consolidation of the old districts has added to the defectiveness and rendered it extremely difficult to get a homogeneous system. Scientific and medical men are anxious upon this subject, but the trouble is, we cannot get money enough. We have a vast surface drainage and underground also, which needs more attention than the other. The system of private drainage is a source of disease, added to constantly by the doings of incompetent workmen, who know nothing of science, and do patch-work so that effluvias get into the houses, and we do not know where it comes from, and it produces scarlet and typhoid fevers, diphtheria and other kindred diseases. We often notice this smell in our own domiciles. What produces it? Why?

DANGERS OF DEFECTIVE PIPES.

Defective pipes, bad closet work, and the people get sick and everybody wonders why? If I could, I would abolish every private closet in the city of Philadelphia; they should be placed out in the air. It would not be so pleasant or comfortable, of course, but a great danger would be averted. Work in them is not well done in the first place, and in the second place they are not well kept; there should be a constant flow of water through all such drains. Take the case of your boilers—they are hardly ever in good order—you notify the plumber; he comes and attends to it, and before he is out of the house hardly, the trouble is as great as ever, if not worse than it was before. The plumber will tell you that the constant contraction and expansion going on in the iron becomes unevenly distributed by the wear and tear, and there is a break. Now the pipes we use for drainage are just precisely the same; they do not, as a rule, break from the weight upon them, but the constant expansion and contraction caused by the temperature breaks them. You know it is fashionable to hide all these pipes under the partitions and in the walls, when they ought every one of them to be exposed, so that the least break or defect could be seen and at once repaired. The stationary wash-bowls are open to the same objection; if you want to repair them you must rip up the whole room almost, and then there is bad material used in them, and these very pipes are the source through which disease, as an insidious, wily enemy, comes like a thief in the night, and people get sick and die without knowing how they become afflicted. The bulk of the reports which I receive are scarlet fever and diphtheria, and the great majority arise from these very pipes and the drainage system in houses. You take the wash-bowl, if it is not properly trapped it is sure to smell. Well, we will say it is properly trapped, that is with an S bend in the pipe where the water rests, but the bank gets stopped up and is not used, the water evaporates and there is no trap at all. But even if there is a trap, there happens to be a pressure of gas in the sewer, why it goes right through the water, and there might as well be no trap there, for it is perfectly useless. These are only some crude ideas upon the subject, but I put them in a forcible, plain way, because the importance of this subject demands it.

HORRORS OF THE SEWERS.

If you lifted the pipes of the city, or rather the coverings of them, and turned the place upside down, you would see a most horrible sight, the grade of our sewers is awful; the manner in which they are built is bad. The contractor lays his brick side by side on the bare ground, not in gravel; that is just what you dont want; then he smears cement over the upper half. Now all the sewage leaks into the ground until it gets so saturated that it can't hold out, and the most of the material percolates through the soil. Sewers should be water-proof and so constructed that they will not leak either up or down. In some of the cities of Europe they are laying their drain pipes of glass or vitrified material. Then again the inlets to sewers are badly constructed. Chief Commissioner of Highways, Mr. Baldwin, will tell you they are badly located, badly constructed and badly trapped, both in the float and inlet. Now, I'll just tell you how some of these people construct sewers. Some years ago, in laying a sewer, one of them came upon a private sewer, which he took up, and in relaying it, according to the plans, he came across a huge boulder, which he could'nt go around very well, nor could he go under it, for it might have extended to the center of the earth for all he knew, so he very quietly ran the sewer over the bolder and made it just like a syphon. Of course the drain was worse than useless; that was bad work, but it was underground, and it would never have been found out where the trouble was if the street had not happened to have been dug up some time afterward to repair a water pipe. Public sewage is better than it used to be, but it is not what it ought to be. This contract system of work is bad in every way. No contractor will lose money on his job; that isn't human nature. A department asks for work to be done; a chap comes along and offers to do it for less than we know it can be done for, but he swears he can do it, and the law compels us to give it to him. Well, he does it, and it isn't very long before it falls in, just like the Mill Creek sewer has done half a dozen times.

RESULTS OF BAD SEWAGE.

The Roman aqueducts were not built in that way, and they did not lay a nine either. Our folks didn't lay it so that it is 9 inches, but set it on edge, so that it is only 4 inches. The people should be nursed up to a proper understanding of this subject, for, as I have said, it is of vital importance to the health of the city."

Mr. Addicks stated that Dr. Rudolph Hering, C. E., had given great attention to this subject of city sewerage, and from him a number of valuable ideas were gathered. He says, in a pamphlet prepared for private distribution among health authorities: "Modern medical science has made great progress in discovering the causes of the origin and spread of disease; and it is now pretty well established that typhoid fever, diptheria, scarlet fever, cholera, and other malarial diseases, are caused, directly or indirectly, by decomposing organic matter. The efficient removal of all refuse is therefore very essential for the good health of the city." It is a fact, verified by statistics, that where house-drains and sewers have been skillfully designed and constructed, a marked decrease of sickness and a reduction of the death rate have resulted. Mr. B. Latham cites twelve cases of cities and towns, with populations ranging from 7818 to 68,056, and death rates varying from 19.1 to 33.2 per 1000, in which, after the completion of sanitary works, the rate was reduced to from 18.6 to 26.2 per 1000, with a diminution in some of typhoid fever cases from 10 to 75 per cent., and from 11 to 49 per cent. in cases of phthisis.

As the drainage system of our city is notably bad, it will justify the conclusion that the occasional prevalence of malarial diseases has probably had its origin in this cause, and the importance of considering a remedy is therefore apparent.

(To be continued.)

Pittsburgh's Water Works.

It would seem that there is no end to the trouble attending the attempt of the people of Pittsburgh to obtain a water supply. After the most unprecedented bungling in designing the engines resulting in the production of things which might safely be worshiped, so far as the letter of the command goes, there follows a series of breakdowns which in themselves are as remarkable as the construction of the engines. Good excuses are always found by the chief-engineer, but these at last begin to be monotonous. So far poor workmanship on the part of the contractor has been the excuse. It would appear that the designer was his own inspector, and to an outsider this plea of poor construction begins at last to look "rather diaphanous."

The last breakdown is the blowing off of a piston from the piston rod and the cracking of the double head between the high and low pressure cylinders, completely disabling the engine. As usual, we have the cry of poor iron and bad workmanship. The reporters of the Pittsburgh daily papers are gravely told that the iron is weak and will only stand a breaking strain of 12,000 or 14,000 pounds per square inch. The casting, which the reporter says is about 5 inches thick at the break, is reported full of old cracks, cold shuts and blow holes. If this is so, we would ask why did Mr. Lowry accept them? Test pieces were cast with all the important portions, and the work was under his own supervision. The statements look suspicious, and are of a nature to make outsiders think that all the blame rests with the designer, who was too ignorant to design a good machine, and too negligent of his duty to see that the workmanship and materials were good.

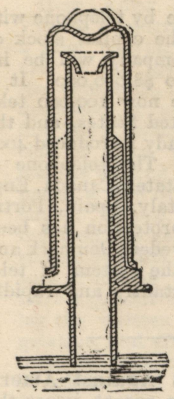
The whole affair, taken in connection with such points of the engines as have been made public, warrant the impression that the material and workmanship have little or nothing to do with the breaking down of the engine. Everything that has so far come to light points to the fact that the breakdowns are due to the absurdity of the design.

If Mr. Lowry ever consents to turn the engines over to the city, we shall expect to hear that the act is followed by a grand and effective break down, in which the engines will "go through themselves" in a style far surpassing any of the attempts which they have hitherto made. Six strokes per minute appears to be the utmost limit of their speed, and that, too, under the most careful jockeying by their designer. It is an open question whether they can keep up this lightning speed when they come into the hands of other engineers. It is not altogether unreasonable to suppose that they will show a falling off, and the average be reduced to four strokes per minute. When the city of Pittsburgh needs water enough to work these engines up to their capacity, we may expect to hear of lively times at the water works. In the meantime we shall wait patiently for the next development. The repairs are expected to be completed in the course of two months. Then we may expect more entertaining accidents.

The Pittsburgh *Commercial*, in giving an account of this highly amusing state of affairs, says:

Our white elephant is again very sick. After an expenditure of about six millions on our water works, the city finds itself with an insufficient system, which bids fair to prove an utter failure. The latest developments are that the Butler street route for the mains, selected against the plainest warning, is unsuitable, if not impossible; the old water works are so nearly on the verge of dissolution that they cannot supply water to the lower city; while last, but not least, an unexpected defect in one of the expensive monsters at Negley's Run has resulted in a breakdown which will take months to repair. * * * Enough water is leaking out of the largest reservoir to supply a small city. What security is there that it will not grow into an irremediable break before repairs are commenced on it next spring? In short, after spending a sum which should have provided two cities like Pittsburgh with a perfect system of water supply, what chance have we of getting enough water for the most necessary sanitary and household purposes? The answers to these questions at present cannot be very reassuring. If any business man should carry on his enterprise as the water and street improvements of this city have been, he would long ago have had the management of his property taken out of his hands by proceedings either under the lunatic or bankrupt laws.

According to the *Electrician*, Mr. Carré makes cast iron magnets by melting soft metal, very slightly carburetted, in crucibles, adding 10 to 15 per cent. of steel filings, and running it into molds. If 1 to 1½ per cent. of nickel be added to the mixture, and 25 to 30-100ths of copper, or 2 per cent. of tin, and 5-100ths of copper, the molded iron can be tempered at a cherry red heat. The best result is obtained, however, by tempering pure cast iron at as high a temperature as the molded pieces will stand without distortion or fracture.



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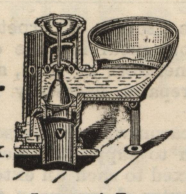

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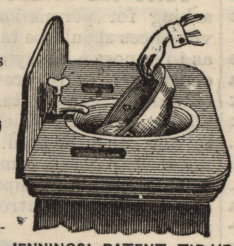

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May be attached to any system of water pipes, automatically emptying them whenever the temperature falls to freezing. **Requires no Care.** With it water may be introduced where otherwise the danger of freezing would forbid, as in stores, manufactories, tenant houses or other buildings liable to be temporarily vacated. Has been in successful use for two winters.

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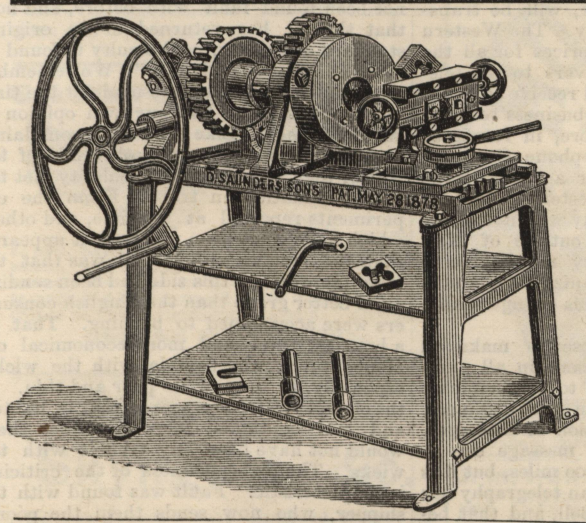

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Pipe Cutting and Threading Machines,

for Pipe Mill use, &c., a specialty.

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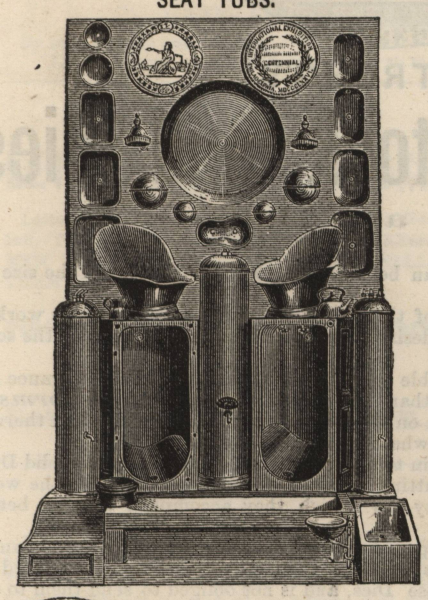

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The weight of the Copper in my BATH TUBS is designated by this stamp.

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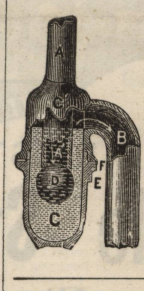

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A POSITIVE SEAL

Against sewer gas, absorbed gases and back water. Seal is not broken by syphonage or evaporation. *Self scouring, not injured by freezing.* It has many other good *points that no trap possesses. Simple, cheap, durable and effective.* Send for full descriptive Circulars to the Manufacturers.

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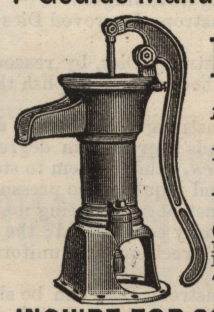

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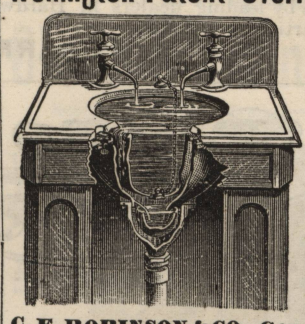

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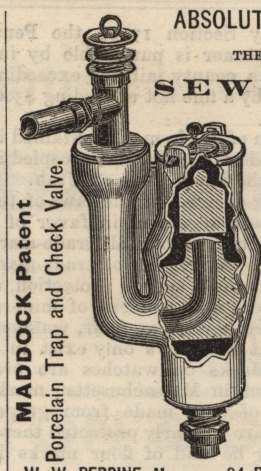

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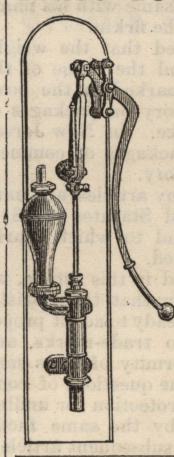

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which have been in use for over 20 years, and give entire satisfaction.

They are warranted.
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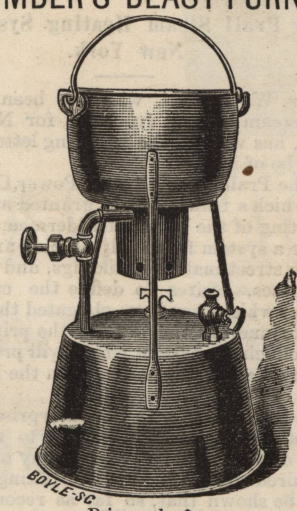
Absolutely Safe. Weighs only 4½ lbs.



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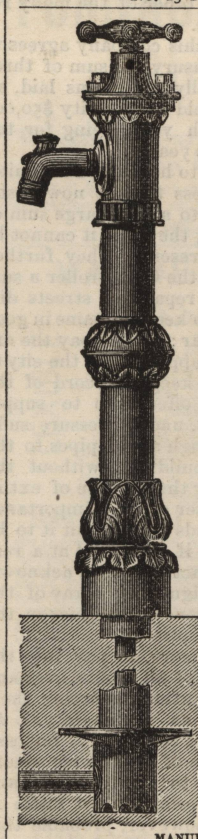

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This is a moving waterway Hydrant, shutting against the pressure. The Valve can be withdrawn and repaired without digging up the Hydrant. The waste is closed before flowing, and the flow before wasting. It has a sediment chamber to prevent the packing of the earth around the waste passage; also a large frost collar to prevent the raising of the Hydrant by the frost.

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PRICES.—Hydrant to set in ground 3 feet, $6.00
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To polish stoves out of doors in freezing cold weather, use **YATES' STOVE POLISH.** (See advertisemeet.)

A Book for Plumbers.

SECOND EDITION.

HOUSE DRAINAGE & WATER SERVICE

IN

Cities, Villages & Rural Neighborhoods.

BY

JAMES C. BAYLES,

Editor of "The Metal Worker" and "The Iron Age."

Illustrated with Wood Cuts and Lar Folded Plates Photo-Engraved from Working Drawings, showing the Methods of piping employed in the best Plumbing Practice of the Time.

The publisher has pleasure in announcing a large and steadily increasing demand for the Second Edition of this standard work, which is the only book that fully and exhaustively discusses the principles and mechanical details of American plumbing practice. Its especial value for the practical plumber will be seen from the following synopsis of its contents:

Chapter I.—Hygiene in its Practical Relations to Health.

This chapter is introductory, giving a brief sketch of the progress which has been made since the Middle Ages in reforming evils prejudicial to the public health, and showing by comparisons drawn from modern architectural practice and mediæval records what progress we have made toward securing health and comfort in house building, and wherein our architecture is still a long way behind our knowledge of Nature's laws.

Chapter II.—Sewer Gas.

A careful inquiry into the nature and action of the gaseous products of organic decomposition in sewers, cesspools, drains and waste pipes. The subject of sewer-gas poisoning is fully considered, and the importance and methods of sewer ventilation discussed.

Chapter III.—Waste and Soil Pipes.

Chapter IV.—Traps and Seals, and the Ventilation of Waste Pipes.

Chapter V.—Water Closets.

Chapter VI.—Service Pipes and Water Service in City Houses.

Chapter VII.—Tanks and Cisterns.

These chapters are strictly practical, dealing with the various house fixtures in general use, and discussing every detail of plumbing work. The examples of good and bad practice are drawn from what the author has seen in the great number of dwellings, hotels and public buildings he has inspected in nearly all parts of the country, and in themselves these five chapters constitute a complete manual of house drainage and water service.

Chapter VIII.—The Chemistry of Plumbing.

This is probably the most valuable chapter to found in the whole literature of sanitary science. Its compilation entailed a vast amount of research and a great deal of careful laboratory work in tests, analyses, &c. It is an exhaustive discussion of the action of waters of various composition upon each of the metals employed in plumbing practice, under all the conditions likely to exist. The results of these researches and investigations are stated in the simplest language and made clear to all classes of readers.

Chapter IX.—Elementary Hydraulics Applicable to Plumbing Work.

Intended chiefly for the use of plumbers and others who encounter difficulties in conducting and raising water, and giving much valuable information concerning pipes, storage tanks, cisterns, pumps, hydraulic rams, and the various methods of applying power in pumping.

Chapter X.—Sanitary Construction and Drainage of Country Houses.

Chapter XI.—Water Supply in Country Districts.

These chapters deal exclusively with conditions existing in villages and country districts. The former discusses causes of unhealthfulness in location, construction, drainage and surroundings; the latter considers the sources of water supply, the care of wells, springs, &c.

Chapter XII.—Suggestions Concerning the Sanitary Care of Premises.

This chapter relates to the care of premises, the removal and treatment of filth, the functions and employment of disinfectants, &c.

Chapter XIII.—The Plumber and His Work.

A discussion of the relations of the plumber to the architect, the builder and the public, and placing the responsibility for the bad plumbing work of the time where it properly belongs.

"House Drainage and Water Service" is a large octavo book of 360 pages, with a full index and side notes on every page to facilitate reference and search. It is substantially bound in English muslin, with beveled edges.

It is a book no plumber whether in city or country, expert or beginner, can afford to be without. A standard work of this kind is invaluable to the plumber, not only for his own information on many subjects connected with his business, but for use with his customers in strengthening and confirming his arguments in favor of honest materials and good workmanship in whatever pertains to the drainage and water supply of a house. The mistaken economy of house owners in encouraging a system of reckless competition for contracts at prices below the cost of good materials and honest labor, is doing much to demoralize the trade and the plumber who is honorably ambitious to do good work at an honest price which will give, him a living profit, will welcome so valuable an ally in the cause of reform as Mr. Bayles's book.

SENT POSTPAID ON RECEIPT OF PRICE, $3.

DAVID WILLIAMS, Publisher,
83 Reade St., New York.

General Summary of the Trade Mark Laws of the States of the United States.*

BY FRANCIS FORBES.

(Concluded.)

The definition of trade-mark contained in the Political Code of California is copied into the Penal Code of Dakota, approved February 7, 1877, Sec. 415 (see Sec. 576 Civil Code); so also are the provisions of the Penal Code of California in reference to counterfeiting trade-marks, and selling goods bearing such counterfeits (Secs. 411 and 413). The punishment, however, is imprisonment in the county jail not exceeding one year or fine not exceeding $500, or both. Other sections of the act, *i. e.*, Sec. 412, against keeping dies, plates, brands or imitations of trade-marks for the purpose of making counterfeits, &c., and Sec. 414, against affixing any imitation of a trade-mark which is the same to the eye or the ear as the genuine, are the same as the acts of Missouri and New York, except in phraseology.

The punishment is the same as prescribed in Secs. 411 and 413, except that the person offending under Sec. 414 " is liable to the party aggrieved in the penal sum of $100 for each and every offense, to be recovered by him in a civil action."

Sections 418 and 419 provide for the punishment of persons refilling or selling bottles, or keeping same without consent, the marks of which had been recorded according to law, by a penalty of 50 cents for each offense, and every bottle filled, bought or sold for first offense, and $5 each for every subsequent offense. Section 420 provides for proceedings to obtain search warrant in cases mentioned in Secs. 418 and 419, and for the summary trial of the offender, when brought before the magistrate, and fine as prescribed.

The Civil Code, Sec. 160, declares that there may be ownership in trade-marks.

In Illinois, in addition to the laws already given, on March 27, 1874, there was approved " An act to revise the law in relation to criminal jurisprudence," which contains the following sections:

"*Section* 115. Whoever knowingly and willfully counterfeits, or causes to be counterfeited, any private stamp, label or trade-mark used by a merchant or manufacturer about the sale of his goods, with intent to defraud the purchaser or manufacturer, or sell such goods with such counterfeit stamps, labels or trade-marks thereon, knowing them to be counterfeit, shall, for each offense, be fined not exceeding $200.

" *Section* 116. When a person uses any peculiar name, letters, mark, device, or figures cut, stamped, cast or engraved upon, or in any way attached to or connected with, any article manufactured or sold by him, to designate it as an article of a peculiar kind, character or quality, or as manufactured by him, whoever shall, without his consent, use the same or any similar names, letters, marks, devices or figures, for the purpose of falsely representing any articles to have been manufactured by him, or to be of the same kind, character or quality as that manufactured or sold by the party rightfully using the same, shall, for each offense, be fined not exceeding $200."

In Kansas " An act (took effect May 31, 1866) to prevent the counterfeiting, changing or destroying trade-marks, devices and brands:"

" *Section* 1. If any person or persons shall willfully change, alter, deface, destroy, counterfeit, cut out or dispose of any trade-mark, brand, impression or device used by any person, company or corporation within this State, to designate a particular description of goods, wares, merchandise, cask, barrel, half-barrel, keg, bottle, package, or the contents thereof, he or they shall forfeit and pay to the owner or owners thereof, for each offense, not exceeding the sum of $25, to be recovered in any court proper to try the same, or before a justice ofthe peace having jurisdiction of same.

" *Section* 2. If any person shall change, shift and place any brand, mark or device used or intended to be used for the purpose aforesaid, to or upon any piece of goods," &c., " or shall intermix, take out, change or shift any article liquid or commodity whatever, into a branded cask," &c., or package, and thereby avail himself of another person's brand, mark or device, he shall forfeit for every offense the sum of $25, to be recovered as above.

Sections 186 and 187 of the Penal Code of Utah (Compiled Laws of 1876, p 608) provide that every person who willfully forges or counterfeits a trade-mark with intent to pass off any goods to which such forged mark is affixed as the genuine goods, and " every person who sells or keeps for sale any goods upon which such counterfeited trade-mark has been affixed, intending to represent such goods as the genuine goods of another, knowing the same to be counterfeited, is guilty of a misdemeanor."

Section 190 provides that every person who has or uses any bottle or other thing bearing the duly filed trade-mark or name of another, for the purpose of disposing, with intent to deceive or defraud, of any article other than that which such bottle, &c., originally contained, is guilty of a misdemeanor. By Section 17 of the Penal Code a misdemeanor is punishable by imprisonment in a county jail not exceeding six months, or by a fine not exceeding $300, or by both.

The definition of trade-mark contained in the Political Code of California is copied in section 189 of the Penal Code of Utah.

The foregoing abstract of the laws of the States is the best argument in favor of a uniformity of action among all trade-mark owners. Particular classes of trade-mark owners have obtained special protection, *e. g.*, manufacturers and venders of mineral water and other beverages, flour, watches, wines, &c. But these laws only exist in a few States. Marks on watches are protected by an act in Massachusetts; marks on receptacles of wine made from grapes grown in Ohio are similarly protected there. The same may be said of flour marks in Missouri.

In certain States it is made obligatory to mark certain articles, *e. g.*, in New York, by act 1860, every person who shall put up and press hay for market shall mark the initials of his name on some piece of wood attached to the bale of hay, and by act of 1865, every manufacturer of butter firkins is required to brand the same with his name and the true weight of the firkin.

In Ohio it was provided that the weight of soap and candles and the name of the manufacturer must be marked on the box; marks were also obligatory on packages of sugar, rice, tobacco, &c. In New Jersey (1877) trade-marks on packages of commercial manures are obligatory.

In South Carolina many articles are enumerated in the Revised Statutes of 1873, subject to inspection, and to which marks and names must be affixed.

From the facts stated in this article, we are led to the conclusion that the Legislatures of the States are ready to adopt proper legislation in regard to trade-marks, and also that a certain uniformity of laws may be readily obtained. The questions of compulsory marks, and of protection for unfiled marks, will be raised by the same facts. They are reserved for a subsequent article.

* Prepared for the United States Trade-Mark Association.

The Prall Steam Heating System for New York.

Mr. W. E. Prall, who has been granted the steam heating franchise for New York city, has written the following letter, which will be of interest:

The Prall Heating and Power Company, to which a franchise was granted at the last meeting of the Board of Aldermen, to introduce a system for supplying heat and power from street mains to buildings, and for other purposes, desires to define the conditions under which they have obligated themselves to remunerate the city for the privilege of introducing a system which will prove quite as great a blessing as has been the introduction of gas.

It is true that with this enterprise, as with all others, the promoters hope to receive a fair compensation for the outlay of capital required for such an undertaking; but it can be shown that, so far as recompensing the city is concerned, nothing approaching the amount offered for the privilege granted has been paid by any other of the many recipients of like grants.

In the first place, this company agrees to pay into the city treasury the sum of three cents per foot annually for mains laid, an amount which will yield to the city $50,000 per square mile each year, being for ten square miles $500,000 yearly.

They further agree to heat all public buildings at 40 per cent. less than it now costs, which would amount to a very large sum of itself; but not having the data, it cannot be exactly specified at present. They further agree to deposit with the Comptroller a sum in cash sufficient to repave all streets disturbed by them and to keep the same in good condition for one year; and to pay the expense of an engineer appointed by the city to inspect the work and keep a record of the amount done; they offer also to supply water from the mains, under pressure sufficient to raise it through stand pipes to the tops of the highest buildings, without the use of fire engines for the purpose of extinguishing fires—a matter of such importance that all unbiased minds must admit it to be a great consideration if furnished at a reasonable rate. This fact has been acknowledged by a petition signed by many of the most prominent insurance companies in the city in favor of its adoption.

They offer, furthermore, to pay into the city treasury one-half of all profits, over and above 10 per centum, after deducting the 3 cents per foot paid as a certainty. As to what this will be, of course it is impossible to say, but the sum of $50,000 per square mile must be paid to the city, in any event, even if the investors do not make 10 per centum. It is, however, probable that the amount paid as one-half of the profits would be very much more than that paid per lineal foot for the pipe.

It must be remembered that the company does not ask for permission to obstruct the street way in any manner, as do street cars and telegraph lines above ground; and there can be no doubt that the system will be a benefit to all property situated on the line of the mains, as it will be a source of perpetual and power, without incurring the expenses of separate generators or fires, and the attendance and repairs necessary for such apparatus.

There can be no reason why the persons asking for permission to supply these conveniences should be taxed to such an extent as to impose a heavy extra charge upon the consumers, or to prevent the public from obtaining the advantages which the scheme affords, many of which cannot be supplied by any other method. This company does not seek to obtain a monopoly, but depends entirely upon the superiority of the system of which it has control for successful competition.

The Telephone Companies.

The following, it is said, gives the present condition of the telephone companies and patents at the present date:

The Western Union Telegraph Company and the Bell Telephone Company have made an agreement by which all the telephone patents owned by the Western Union, including the Bell, Edison, Gray and Blake transmitters, and all instruments connected with the telephonic service, will be transferred to the Bell Company. The Western Union will be paid at cost prices for all the instruments which it delivers to the telephone company, and it will receive as a consideration one-fifth of the business returns. All telephones will, therefore, in future be leased from the Bell Telephone Company through its local offices or agencies. The agreement between the Western Union and the Bell Telephone Company will not affect existing local companies outside of New York, except so far as they may agree to change their names or organizations, and it is contemplated to make this change within a short time.

The Bell Company propose to make an arrangement by which persons in all parts of the country will be able to communicate with each other by telephone great distances, not affecting the transmission of messages. Along submarine cables a message can at present be sent over only 100 miles, but it is said that this defect in ocean telegraphy has been overcome by Prof. Bell, and that before many weeks a person in New York will be made to communicate by telephone with a person in London. The capital stock of the Bell Telephone Company will be increased from $850,000 to $8,000,000. It is estimated that there are now 100,000 telephones in use in the United States, and the Bell Company have already introduced 4000 telephones in London. The telephone is patented in the United States, Canada, England, France, Austria, Italy, Spain, Portugal and Australia, and protection has been asked for in Norway, Sweden, Denmark and Russia. In New York the system of telephonic exchanges is constantly and rapidly increasing.

English Complaints Against American Oil.—In one of its recent issues the London *Ironmonger* has the following paragraph in regard to petroleum received from this country: " Last year a great deal of the oil sent here from America was of very inferior quality, and much of the dissatisfaction arising from its use was unjustly visited upon the heads of English lamp makers, whose wicks were declared by the American oil firms to be too thin for the free supply of the oil. The wicks, however, had not been found fault with before, and now that the oil has returned to its original standard of quality, no difficulty is found in using it in English lamps." We remember the complaints which were made at the time very well, and we had our own opinion in regard to them. Like most of the complaints and fault-finding from the other side of the water, they had in all probability not the least foundation in truth. From the experiments reported at the time, and others which have since been reported, it appeared that the trouble with the oil was that the manufacturers on this side had been sending out a better grade than the English consumers were accustomed to burning. That is, a heavier, safer and more economical oil. Hence there was trouble with the wicks, especially if they were poor and thin. If the oil had really been poorer (that is, lighter) and had contained more gasoline, there would not have been any trouble with the wicks. The pigheadedness of the criticism is characteristic. Fault was found with the shipper, who now sends them the poorer quality which they want.

ARMSTRONG'S

Adjustable Stock and Dies

For Pipe and Bolts,

Have the following advantages:

1st.—The Armstrong Improved Dies can be adjusted to the variations in the size of fittings.

2d.—The Armstrong Dies, by reason of their peculiar cutting edge, can be worked with much less labor, and accomplish the desired results in less time, than with the solid Die.

3d.—The Armstrong Dies have a double taper that is, the taper at the entrance for the first few threads is greater in degree than the standard taper, ***which forms a lead to the Dies,*** causing them to start on the pipe without filing, even when there is a swell or burr, and requiring no pressure whatever to start the Dies on the pipe.

4th.—The Armstrong Dies being made in two parts instead of one (as in the solid Die), can be more perfectly constructed; the cutting edges reached more directly; the work done with greater precision and uniformity, by which they accomplish a much better result.

5th.—The Armstrong Dies can be sharpened without drawing the temper, and can be kept in good condition easier and with less expense than any other Dies ever offered to the public. A mechanic can sharpen these Dies, and is not obliged to send them to the manufacturer, as is the case with solid Dies when they become dull.

6th.—The Armstrong Dies are interchangeable in the stock, and although adjustable, do not need adjusting to cut the standard size for which the dies are made. The adjusting is only done when the irregularity or variations in the fittings make it necessary. There are corresponding marks (§) on the Stock and on the Dies (§) and when these marks are brought into line the Dies will cut the standard size.

For sale by leading dealers in Hardware and Steam and Gas Fitters' Tools. For further particulars address,

F. ARMSTRONG, Bridgeport, Conn.

WITH OFFSET.

Zane & Co.'s

PATENT

"THE SANITARY"

Water Closet.

TESTIMONIAL.

102 SUDBURY STREET,
BOSTON, December 2, 1878.

DEAR SIR:—Your "Closet," placed in my house a year or more ago, is perfect and complete. Yours, &c.,

WM. ROBINSON.

Fred. Adee,

52 Cliff St., New York, Sole Agent.

Herr Adler has communicated to the Vienna Photographic Society the details of a new copying process, based upon the use of the gelatine plates employed in the apparatus, like the pektograph already described by us. For writing or drawing Herr Adler uses a concentrated solution of alum, to which, in order to render the writing or drawing visible upon the paper, a few drops of some aniline color is added. Before laying the writing or drawing upon the gelatine surface, pass a damp sponge over the latter, and allow the moisture to sink in for a few minutes, so as to have a greater effect upon the alum. Then lay the written side downward upon the gelatine, and after the lapse of a few minutes, on removing it the writing will be found reversed and eaten into the gelatine film as if it were engraved. By means of an india-rubber roller a little common printing ink is spread over the plate and absorbed by the lines sunk by the alum, and again rejected on the application of moisture upon the paper laid down upon it and smoothed over it by the flat hand. When removed, this paper will have upon it the first impression of the writing or drawing. For each succeeding impression the plate must be inked, as in lithography, by the india-rubber roller. A considerable number of impressions can be taken.

Eckel's Patent Eave Trough.

In offering to the trade our long Eave Gutter, we would say that it is far superior to the old style of gutter (made in 14 or 20 inch lengths), for the reason that in our gutter you have only 4 seams in 24 feet, when, if made of 14 inch tin, you have 20 seams, and if made of 20 inch tin you have 14 seams. We pack samples carefully, Send for sample and be convinced of its superiority. Machines and State rights for sale only. Address

GEORGE ECKEL & SON,
Richmond, Ind.

Special Notices.

Skylights, &c.

All persons are hereby cautioned against the purchasing, using, vending or selling, or having in their possession for sale or use, any Metallic Skylights, whether wholly or in part embraced within certain Letters Patent of which I am the sole and exclusive owner, without my permission and license, as such will be prosecuted to the fullest extent of the law.

Copies of said Letters Patent may be inspected at my office, or that of my counsel, and all duly authorized Skylights will bear my label.

All so-called patents of other persons are contingent to, and infringements upon, mine, and calculated to deceive.

GEORGE HAYES,
71 Eighth Avenue, New York.
January 1, 1880.

By his Attorney and Counsel,
JAS. H. WHITELEGGE, 136 Chambers St., N. Y.

THE STYLOGRAPHIC LETTER COPYING BOOK.

Letters written and copied at one writing. No Ink. No Press. No water used. ALL BUSINESS MEN USE THEM. ALL STATIONERS SELL THEM.

Send for Circular to the Manufacturers

J. S. McDONALD & CO,

Blank Book Makers, 158 and 160 Clark St.,
CHICAGO, ILL.

For Sale.

A well-established business, centrally located in large city, with most complete stock of Stoves, Tinware and House Furnishing Goods Will sell most reasonably, to close up an estate. Full set of Tinsmith's Tools, with shop attached.

Address "H. K. M,"
Office of *The Metal Worker*, 83 Reade St., N. Y.

Important to Stove Dealers.

My Patent Air-Heating Attachment for Cooking and other Stoves, Ranges, &c., by which an adjoining or upper room can be thoroughly warmed by one fire, is now for sale in state, county or shop rights. My terms are so reasonable as to leave no room for an infringement of my patent, and at the same time so liberal as to insure large profits to the trade. Circulars sent on application to J. M. PATTERSON, Patentee, Woodbury, N. J.

Wanted.

A man who understands the manufacture of stamped and pieced Tinware. One competent to take charge of Stamping Works. Address

"STAMPING WORKS,"
Office of *The Metal Worker*, 83 Reade St., N. Y.

FOR SALE.---$5500.

One of the oldest-established **Hardware, Housefurnishing, Stove, Heater, Range and Furnace Business** on Fulton St., Brooklyn. Large Tin Shop, with full set of Tools. Low rent. Address

"FULTON,"
Office of *The Metal Worker*, 83 Reade St., N. Y.

FIRE STONE. FIRE STONE.

To Manufacturers of Soft Coal Stoves.

FIRE STONE,

A New Lining for Fire Chambers. A Late Discovery.

Trade SOFT COAL. Mark.

CHEAP. DURABLE. CLINKERLESS. TRY IT.

It has proved to be the most economical and enduring lining ever used in soft coal stoves. It will add to the value of stoves without increased cost.

NEWTON & CO., Manufacturers, Albany, N. Y.

See Testimonial, besides which we have numerous others of same tenor as Mr. Ransom's.

RANSOM STOVE WORKS, ALBANY, N. Y., October 9, 1879.

Messrs. NEWTON & CO., ALBANY, N. Y.—GENTS: We have been testing your new brick for several months in a stove (the "Denmark," late "Derby") burning soft coal, and have submitted the brick to the severest test, by the most intense heat when cast-iron would melt, and after repeated examinations we cannot discover the *least indication of adhesion of clinker*. If you can furnish a brick such as we are testing, it will fill a great want, viz.: durability and cheapness, as compared with iron linings.

Yours respectfully.
S. H. RANSOM.

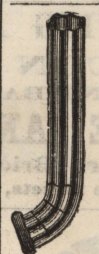
TRY TRY

Best on the Globe.

Made of better material, with greater care, and beyond question are the only first-class **SIFTERS** in the market. Made in two sizes, and now offered to the trade at BOTTOM PRICES.

Circulars free.

J. M. HUNTER & CO., Sole Manufacturers
30 Emery Arcade, Cincinnati,
153 Monroe Street, Chicago.



"AUSTIN'S" PATENT
EXPANDING CONDUCTOR
OR
RAIN-SPOUT,

Manufactured of
Galvanized Iron and all Sheet Metals.
Regular Sizes, 2, 3, 4, 5 and 6 Inch.

AUSTIN, OBDYKE & CO.,
SOLE MANUFACTURERS,
1705 and 1725 Chestnut Street,
PHILADELPHIA, PA.

By a recent decision of the U. S. Circuit Court, the exclusive right to manufacture expanding conductors is secured to WILLIAM AUSTIN, and all parties making, selling or using expanding conductors other than Austin's will be held liable by suit.

PRINCIPAL AGENTS.

M. Halliday, New York City; S. D. Hicks & Son, Boston, Mass.; Sidney Shepard & Co., Buffalo, N. Y.; Geo. W. Pitkin & Co., Chicago, Ill.; Wasson & Martin, Albany, N. Y.; McLeod, Reardon & Co., Troy, N. Y.; W. H. Scott, Portland, Me.; Kittredge Cornice Co., Salem, Ohio; J. W. Jordan, Worcester, Mass.; B. G. Carpenter & Co., Wilkesbarre, Pa.; Miller Iron Co., Providence, R. I.

The Leading Wringer of America.

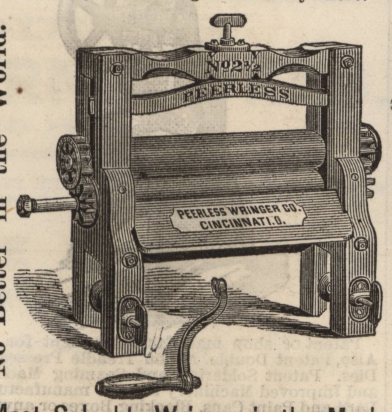
SIMPSON & GAULT,
(Peerless Wringer Co.)

New York Office, 79 *Chambers St.*
European Offices, *Place Vendome, Paris. 7 Poultry, London.*

Office and Factory,
CINCINNATI, OHIO.

PEERLESS Clothes Wringers,

Sold by the Jobbing Trade everywhere.

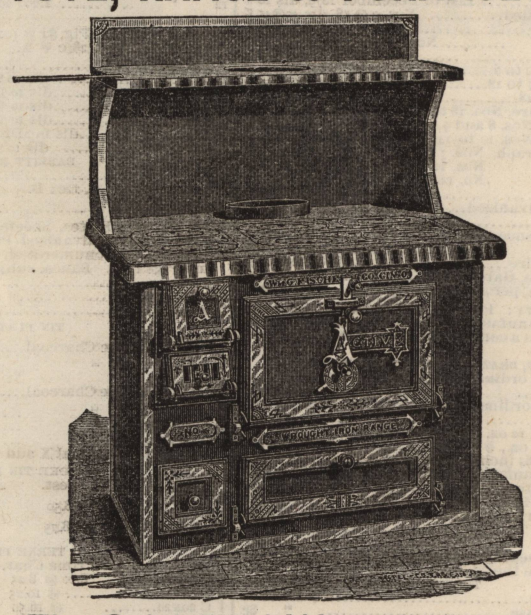


No Better in the World. Strongest and Handsomest.

Most Saleable Wringer in the Market.
TRY A SAMPLE ORDER.

WM. C. FISCHER. THOS. B. DIEHL.

UNION STOVE, RANGE & FURNACE WORKS.



The Celebrated Wrought-Iron
GRAND ACTIVE RANGES.

Made in 892 Varieties.

Adapted to Family use, Restaurants, Hotels, Public and Private Institutions.

WM. G. FISCHER & CO., Manufacturers,
CINCINNATI, OHIO.

Catalogue sent on application.

DIGHTON FURNACE CO.,

MANUFACTURERS OF

FURNACES, RANGES AND STOVES,

Sinks and Hollow Ware,

to suit any market in the world. The celebrated

Winthrop Furnace, Winthrop Range, Winthrop Base Burner, Winthrop Oval Parlor, Winthrop Air-Tights and Cottages.

A full line of first-class goods. It is our aim to be unsurpassed in the quality of our product, and our specialty to make only first-class work and sell it to the trade at the lowest possible prices.

Office and Foundries at North Dighton, Mass.

VANDERVOORT'S

FLEXIBLE CEMENT

STOPS ALL WATER LEAKS

On roofs of all kinds, around chimneys, copings, skylights, joints and seams in wood and iron, laying slate roofs, copings, and any place required to be made water tight. Ready for use with trowel; does not crack, chip off or run. Price, in tubs and barrels, 5 cents per pound. Special rates by quantity. Cans for family use, retail, $2.40, $4.20 and $7.20 per dozen. 25 per cent. off.

Champion Stove Cement, composed of fire-proof ingredients, ready for use, is the best ever manufactured for cementing seams and joints in stoves and mounting the same. Price, 4 cents per pound, in kegs and barrels. Special rates by quantity. 15-lb. can sent for $1.

Iron Ore Furnace Cement, for setting furnaces and packing joints in same, making them gas tight. Forms like iron, and contains no oil. Prices in 5 and 12-lb. cans, packed, 50 pounds upward, 8 cents per lb. Special price in barrels. 12 lb. cans sent for $1.

Vandervoort's Cement and Paint Works,
116th Street and East River, N. Y. City.

Pat. Mineral Wool.

A. D. ELBERS, 26½ B'way, N. Y.
Address P. O. Box 4461.

Keep a high luster on your sample stoves, especially at this season. It aids greatly in making sales. (Read **Yates & Co.'s** advertisement.)

Baltimore Terra Cotta Works.

N. M. RITTENHOUSE,

Manufacturer of

Stove Brick Linings,

Square, Key and Wedge Fire Brick,
Cupola Brick and Slabs,
VITRIFIED DRAIN AND SEWER PIPE
With Connections.

Yard foot of Cross St., BALTIMORE.
Send for price list.

JOSEPH SCHEIDER & CO.,

Manufacturers of

Plain, Stamped and Japanned
TIN WARE,

Tinners' Trimmings, House Furnishing Goods, &c.

Office and Salesroom, 51 CLIFF STREET.
(Lately occupied by Fraser, Bell & Loughran.)
Factories, 23d st. and 1st ave., and 29th st. and 1st ave.
NEW YORK.

Wholesale Prices in New York

METALS.

Bar Iron, from Store.

Common Iron:
¾ to 2 in. round and square..... } ₩ lb @ 3.2c
1 to 6 in. x ⅜ to 1 in..... }
Refined Iron:
¾ to 2 in. round and square..... } ₩ lb @ 3.5c
1 to 6 in. x ⅜ to 1 in..... }
1 to 6 in. x ¼ and 5-16..... ₩ lb @ 3.7c
Rods—5-8 and 11-16 round and square... ₩ lb @ 4.0c
Bands—1 to 6 x 3-16 to No 12..... ₩ lb @ 4.0c
Norway Nails Rods..... 6½c

Sheet Iron.

	Common American.	R. G. American.
Nos. 10 to 20	₩ lb 4¾c	5¾ @
21 to 24	" 5 c	5¾ @
25 to 26	" 5¼c	6 @
27	" 5⅜c	6¼ @
28	" 5½c	6¼ @

Galvanized, 10 to 20, B B, ₩ lb 9½c; 2d quality, ₩ lb 8½c
" 21 to 24, " " 10½c " .... " 9½c
" 25 to 26, " " 11½c " .... " 10½c
" 27 " " 12½c " .... " 11½c
" 28 " " 13½c " .... " 12½c
Patent Planished..... ₩ lb A, 11 B, 10 c
Russia..... ₩ lb, 12½c @ 13½c
Am. Cold Rolled..... ₩ lb 6 @ 6½c

Iron Wire.

Brass and Copper.....List of December 1879, dis 10 %
Bright and Annealed.....Nos. 0 @ 18, dis 40@45 %
" " .....Nos. 19 @ 26, dis 50@55 %
" " .....Nos. 27 @ 36, dis 60@62½ %
Coppered..... Nos. 0 @ 18, dis 35@40 %
Galvanized, Nos. 0 to 6..... ₩ lb 10c, dis 35@37½ %
" Nos. 7 to 18.....market list, dis 35@37½ %
Tinned, Nos. 0 to 18.....dis 37½@40 %
Tinned Broom Wire, Nos. 18 to 25..... dis 55@57½ %
Annealed Fence, Nos. 8 and 9..... dis 42½ %
" Grape. Nos. 10 to 14..... dis 42½ %
Galvanized Telegraph, Nos. 7 to 9..... ₩ lb 8½c
" Nos. 10 and 11..... ₩ lb 9½c
" No. 12..... ₩ lb 10c
Fence Staples..... ₩ lb 6@6½c
" Staples, Galvanized..... ₩ lb 7½@8c
Stubs Steel Wire..... $7.00 to £
Japanned Barb Fence..... ₩ lb 11½c
Galvanized " " ..... ₩ lb 12½c
Judd's Picture Wire.....dis 80&20&10 %
Clothes Line Wire, Galvanized..... ₩ coil 30@ 40c net
Green Wire Cloth, per sq. foot, 3c @ 3½c.....net

COPPER.—Duty: Pig, Bar and Ingot, 5c; Old Copper, 4c ₩ lb: Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 10 oz., ₩ sq. ft. and over..... ₩ lb 30c
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., ₩ sq. ft..... " 32c
Braziers' Copper 10 oz. and 12 oz., ₩ sq. ft..... " 34c
Lighter than 10 oz., ₩ sq. ft..... " 36c
Circles less than 84 inch in diameter..... " 33c
84 inch diameter and over..... " 36c
Segment and Pattern Sheets..... " 33c
Locomotive Fire-Box Sheets..... " 30c
Sheathing Copper, over 12 oz. ₩ sq. ft..... " 28c
Bolt Copper..... " 30c
Copper Bottoms..... " 33c

No Copper is Sheathing except 14X48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

14x48, by the case..... ₩ sheet 6c
14x48, less than case..... " 8c

For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER. net.

14x48.
16 and 16 oz. and heavier....37c By the case...₩ lb 36c
12 oz. and lighter.....40c " " ... " 39c

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
and 16 oz. and heavier....39c By the case...₩ lb 38c
(And all sizes not over 20 inches wide.)
30x60.
14 and 16 oz. and heavier..... ₩ lb 41c
12 oz..... " 44c

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis 10%
December, 1879.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lb, add 3c ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in.....30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive.....35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive.....38c
½c ₩ lb advance on each No. above Nos. 28 to 38, inclusive.
All brass thinner than No. 38 is Platers' Brass, at...53c
Sheets 24X48 in., and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in..... 37c
Printers' Rules..... 45c
Sheets wider than 30 in. and under 40 in..... 47c
" 40 in. and over..... 50c
Circular sheets, in diam. from 4 in. to 14, inclusive...40c
" " over 14 " 20, " ...45c
" " " 20 " 30, " ...49c
" " " 30 " 40, " ...55c
" " " 40 in..... ...59c

LOW BRASS.

Four cents ₩ lb more than High Brass.
Gilding Metal 8c ₩ lb more than High Brass.
Platers' or Gold Metal } In Bars.....48c
} Sawed.....51c
} Planed or Polished.....54c

FOR SLITTING.

Metal, in width 2 in. to ⅓ in. to No. 28, inclusive 1c ₩ lb advance.
Metal, in width 2 in. to 1 in. thinner than No. 28, 2c ₩ lb advance.
Metal, in width 1 in. to ⅛ thinner than No. 28, 3c ₩ lb advance.
Metal, in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c ₩ lb advance.
Metal, in width ⅛ in. to ¼ thinner than No. 28, 5c. ₩ lb advance.
Metal, ¼ in. in with and less, 10c ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 in. to No. 26	$0.52	$0.70
6 " " "	.56	.76
10 " " "	.64	.88
15 " " "	.74	1.03
18 " " "	.80	1.12

German Silver Sheets over 12 in. wide and weighing more than 16 lb. $2 ₩ lb.
Advance 2c for each additional inch in width above in., and 2c ₩ lb on each No. thinner than Nos. 26 to 30, inclusive.
All German Silver thinner than No. 36 is Platers' at 50c ₩ lb additional.
German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 0 to 20	$0.33	$0.37	$0.43
No. 21	.36	.40	.46
No. 22	.37	.41	.47
No. 23	.38	.42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.53
No. 26	.45	.49	.55
No. 27	.48	.52	.58
No. 28	.52	.56	.63
No. 29	.55	.59	.66
No. 30	.58	.62	.72
No. 31	.62	.66	.78
No. 32	.66	.70	.84
No. 33	.70	.74	.93
No. 34	.74	.78	1.03

Spring Wire 2c ₩ lb advance.
Flat, Square and Half Round Wire, 5c ₩ lb advance on Round Wire.
Fancy Wire not less than 0c ₩ lb advance Round Wire.

Brass Rods, No. 8 and larger, not less than 2 feet lengths, 33c.
Wire straightened and cut smaller than No. 8, and not less than 2 feet lengths, 38c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents ₩ lb extra for spooling on 1 lb spools.

MISCELLANEOUS.

Brass Pail Ears..... $0.50
Brass Door Rail..... .43

SCRAP—Net.

High Brass..... $0.13
Low " ..... .15
Gilding..... .17
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING—DIS. 10 %

Plain to No 20, inclusive, above ¼ in. to 3 in $0.43
" above 3 in..... .53
Nos. 21, 22, 23, 2c advance on List for each Number.
Nos. 24, 25, 26, 4c advance on List for each Number.
Above No. 26 special rates.
Plain ¼ in..... .70
" 3-16 in..... 1.10
⅛ in..... 1.6c
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20..... .50
English, Scotch and Extra Patterns Fancy Tubing to No. 20..... .55
Tubing Sawed or Cut 2 to 4 feet long, 2c advance on List.
Add to 2c ½c for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ¾ in., 25c ₩ lb advance.

ZINC TUBING—NET.

Plain..... .27
Fancy..... .33
Scotch and Extra Patterns..... .36

GERMAN SILVER TUBING—DIS. 10 %.

4 per cent.	.80	15 per cent.	1.35
6 "	.90	16 "	1.40
9 "	1.05	18 "	1.50
12 "	1.20	20 "	1.60

LEAD—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1½c ₩ lb: Pipe and Sheet, 2¾c ₩ lb.

American..... 6 @ 6¼c
Bar..... dis 10 %..... 7½c
Pipe..... dis 10 %..... 7½c
Tin-Lined Pipe..... dis 10 %..... 15c
Sheet..... dis 10 %..... 8 c
Shot.....dis 10 %Drop, 7½c Buck, 8½c dis 10 %
Chilled Shot.....dis 10 %.....9 c dis 10 %

BABBITT METAL.

N. P. U..... ₩ lb 7 @ 8c
A. 20c · B, 16c; C, 12c; D.
ANTIMONY.....18@20
TIN—Duty: Plates, Sheets, Tagger and Terne, 1.1c ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 % ad val. Bars, Block and Pigs free. Banca, subject to duty of 10 %.
Banca..... ₩ lb 26c
Straits..... ₩ lb 24c
English..... ₩ lb 23c

TIN PLATES.

I C 10X14 } Prime Charcoal.....$9.00
14X20 }
12X12 " $9.25
I X 10X14 } Prime Charcoal.....$11.00
14X20 }
12X12 " $11.25
D C 12½X17 " $8.50
D X 12½X17 " $10.50
For each Aditional X add.....2.00

COKE TIN PLATE.

	Best.	2d. quality.	Wasters.
I C 10X14 }	$8.50	$8.25	$7.37½ @ 7.50
I C 14X20 }			
I C 12X12	$8.75	$8.50	$7.50 @ 8.00

TERNE PLATE.

	Prime Char.	2d. quality.	Coke.
I C 14X26	8.00 @ 8.25	7.75 @ 8.00	7.50 @ 7.75
I X 14X20	.... @ 10.25		
I C 20X28	@ 16.50	15.50 @ 16.00	14.50 @ 15.00
I X 20X28	.... @ 20.50		
I C 20X200	.... @ 23.00		
14X20 M. F. Brand			10.00@ 10.25

SOLDER.....No. 1. 13c @ 14c; No. 2, 12½c
SPELTER—Duty: Pigs, Bars and Plates, $1.50 ₩ 100 lbs.
American, ₩ 100 lbs..... 6¼c
Bergen Port from Lehigh Ore..... 10c
Lehigh, on spot..... 9c
ZINC—Duty: Pig or Block, $1.50 ₩ 100 lbs. Sheet, 2½c ₩ lb.
Sheet, " ..... cask, 8¼ @ 8½c
" " ..... open, @ 9 c

Paper Stock, &c.

(Dealers' Selling Price.)

Canvas linen..... 4 @ 4½
White cotton, New..... 5½ @
" " No. 2..... 2¾ @ 3
White linen rags, No. 1..... 5½ @ 5¾c
" " No. 2..... 3 @
Seconds..... 2½ @
Mixed woolens..... 2½ @ 3¼c
Soft woolens..... 14 @ 15 c
Gunny bagging..... 3⅜ @
Jute Butts..... 3 @ 3½c
Kentucky bagging..... 4½ @
Waste paper and scraps..... @ 1c
Rope cuttings..... 1½ @ 3 c
Kentucky bale rope..... 4 @ 4½c
Grass Rope..... 3 @ 3¼c
Tarred shaking..... 1½ @
Hard white shavings, No. 1..... 3½ @
Soft " No. 1..... 3 @ 3½c
White shavings. No. 2..... 2¾ @
Mixed shavings, part white..... 2¼ @ 2¾c
Imperfections, No. 2, best folded sheets. ....3¼ @
" No. 1, heavy stock..... 3½ @
Book stock..... 2¾@3c
" heavy..... 3c
" light..... 1½@1¾c
Newspapers..... 2¼ @ 2½c
Prints..... 1¼ @
Pure manilas..... 2 @2½c
Bogus manilas and hardwares..... ¾ @ 1
Commons..... 70 @
Binders' board cuttings..... 80 @
Straw board cuttings..... 75 @
Woolen tailor clips..... 18 @ 19c
Satinet tailor clips..... 2½ @ 3 c

Paints, Oils, etc.

Paints.

Black lamp—Coach Painters..... ₩ lb 20c
" " Ordinary..... 6c
" Ivory Drop, fair..... 12 @ 15c
" " best..... 23c
Black Paint, in oil..... kegs, 8c; assorted cans, 11c
Blue, Prussian, fair to best..... 40 @ 55c
" " " in oil..... 25 @ 55c
" Chinese dry..... 8½c
" Ultramarine..... 18 @ 30c
Brown, Spanish..... 1¼c
" Van Dyke..... 10 @ 12c
Carmine, 40..... combination price
Green, Chrome..... 15 @ 23c
" " in oil..... 14 @ 18@ 25c
" Paris..... good, 25c; best, 30c
" " in oil..... " 30c; " 45c
Iron Paint, Bright red..... ₩ lb, 2¼c
" Red..... " 2c
" Brown..... " 1½c
" Purple..... " 3c
" Ground in oil, Bright Red..... " 5½c
" " " Red..... " 5c
" " " Brown..... 4½c
" " " Purple..... " 6c
Mineral Paints..... 1¼ @ 4c
Orange Mineral..... 10c
Red Lead, American..... 7½c
" " English..... 9½c
" Venetian (N. C.) dry..... $1.65 @ $1.70
" " in oil..... asst'd cans, 11c; kegs, 8c
" Indian dry..... 9 @ 12c
Rose Pink..... 10 @ 13c
Sienna, American, Raw..... 4c
" Burnt..... 4½c
" " in oil..... 10 @ 16 @ 20c
" Raw " ..... 11 @ 15 @ 25c
Umber, Burnt..... 4 @ 8c
" " in oil..... 9 @ 12 @ 16c
" Raw..... 3½ @ 7½c
" " in oil..... 10 @ 16 @ 18c
Vermillion, Chinese..... 90c
" English..... 60 @ 62½c
" Trieste..... 1.10c
" American, Common..... 15c
White Lead, American, pure dry..... 6 to 7c
" " " in oil..... 8½c to 9c
White, Paris, English, prime.....in bbls. 2 @ 2½c
Yellow Ochre, French..... $1.75
" " in oil...asst'd cans, 11c; kegs, 8c
" " Vermont.....in casks 1½c
Yellow Chrome.....17 @ 27c
" " in oil.....14 @ 18 @ 25c
Zinc White, American No. 1, dry.....
" " No. 1, in oil 9c
" French (Paris).....8 @ 10c
" " in oil..... @ 10c

Oils.

Linseed, Raw, in casks and bbls..... ₩ gal. 85@ 86c
" Boiled, " " ..... 90@ 91c
Bleached Whale..... 64c
" Elephant..... 68c
" Sperm..... 1.15c
Signal..... 65c
Prime Lard..... 66c
No. 1 ..... 60c
West Virginia..... 18 @ 25c
Drilling..... 40c
Empire Cylinder..... 64c
Miners Oil..... 45 @ 50c
Fish Oil, pressed..... 48c
Neatsfoot..... 85c
Tallow..... 70c
Machinery..... 40c
Engine..... 50c

Sundries.

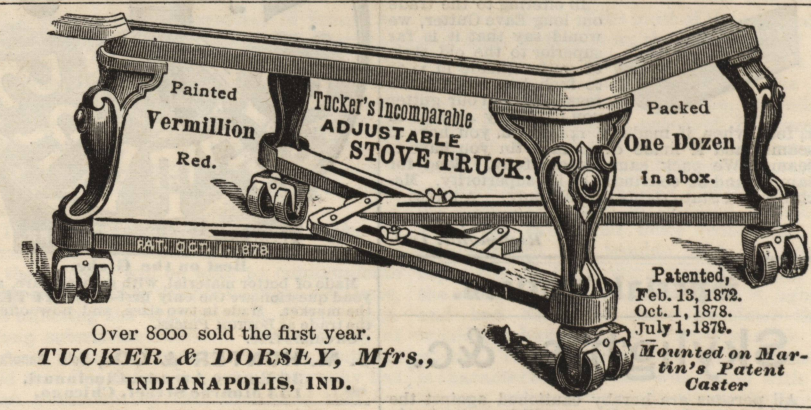
Asphaltum..... 9c
Benzine..... ₩ gal. 16c
Chalk..... ¾c
" Block..... ¾c
Dryer, Patent, Am'n.....ass't cans 10½c; keg, 9c
Frostings..... 50c
Glue, White..... 33 @ 44c
" Sheet..... 20c
Glaziers' Points, Zinc..... 8c
Gum, Copal..... 36c
" Damar..... 25c
" Shellac, English..... 48c
" " dark..... 42c
Litharge, English..... 9c
Mineral Wool, lb..... 1¼ @ 1½c
Pumice Stone, selected Lumps..... 4 @ 6c
" " powdered..... 2¾c
Putty in bladders..... 3c
" in bulk..... 2½c
Rotten Stone, soft, English..... 8c
Spirits Turpentine..... 42c
Whiting, Spanish..... ¾c

CHARCOAL LEADED PLATE, IC 14x20, IX 14x20.
CHARCOAL LEADED PLATE, IC 20x28, IX 20x28.
COKE LEADED PLATE, IC 14x20, IC 20x28.
CHARCOAL BRIGHT PLATE, The Various Sizes.
COKE BRIGHT PLATE, The Various Sizes.

SHEET IRON—American Russia, Patent Planished. Tuttle & Bailey Registers at factory prices.
Coal Hods, Elbows, Stove Boards, Shovels, &c.

A Full Assortment of Tinmens' Supplies.

LYON, CONKLIN & CO., Baltimore.



Over 8000 sold the first year.
TUCKER & DORSEY, Mfrs.,
INDIANAPOLIS, IND.

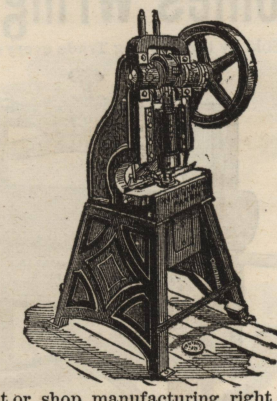
Patented,
Feb. 13, 1872.
Oct. 1, 1878.
July 1, 1879.
Mounted on Martin's Patent Caster

TROY STOVE LINING AND FIRE-BRICK WORKS.
BACON & HENRY,
Successor to **J. BLUNT BACON** and **BELL & BACON,**
STOVE, RANGE AND HEATER LININGS
Fire Brick, Blocks, &c.
Corner of First and Monroe Streets, - - - - TROY, N. Y.

Manufactured by
SCHENECTADY STOVE COMPANY,
at their Hollow Ware Foundry,
Schenectady, N. Y.
Catalogues and prices of Stoves, Hollow Ware Plain and Enameled Hoppers and Urinals for warded on application.

JAMES LANEY & CO.,
Jobbers in
Plain, Stamped and Japanned Tinware,
Cash paid for all kinds of Old Metals, country mixed Rags, all kinds of assorted Cotton and Woolen Rags, Old Rope, Rubber, Calf Skins, Pelts, Beeswax, &c.
144 E. Main St., ROCHESTER, N. Y.

Gordon's Patent Combination Power Press.

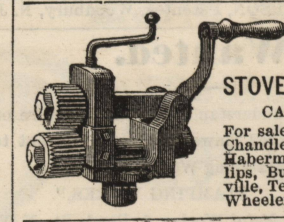


Patent or shop manufacturing right for sale. Also, Patent Double Action Treadle Presses and Dies. Patent Soldering and Seaming Machines, and Improved Machinery for the manufacture of Lard and Paint Cans, Blacking Boxes or anything in the tin line. W. J. GORDON,
235 Bread Street, cor. New Street, Philadelphia.

NEWTON & CO.,
ALBANY, N. Y., Manufacturers of
FIRE BRICK
Stove Linings,
Range and Heater Linings,
Cylinder Brick, &c., &c.

A. F. WRIGHT,
2356½ Broadway, Cleveland, Ohio
PATENTEE AND MANUFACTURER.

The purpose of which is not only
TO GUARD AGAINST FIRE,
BUT ALSO
To Render the Chimney Flue adaptable to Stovepipes differing in size.



WHEELER'S
Improved
STOVE PIPE FLUTER
CAN'T BE BEAT.
For sale by Cragin Bros. & Chandler, Chicago, Ill.; F. Haberman, New York; Phillips, Buttorff & Co., Nashville, Tenn. Made by W. A. Wheeler, Indianapolis, Ind.

J. M. ROBINSON & CO.
MANUFACTURERS OF
PRESSES AND DIES,
AND
Sheet Metal Bending
AND FORMING MACHINES.
Send for Catalogue.
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THE

NATIONAL STOVE & FURNACE WORKS.

SANFORD'S

New Challenge Furnaces and Heaters,

With Cast and Wrought Iron Radiators.

Stag's Head Elevated Oven Range, and Heating Range.

ELK and COMPEER, Improved Low Double Oven Ranges. | **PREMIER,** Single Oven for French Flats.

FIRESIDE JEWEL

Fire Place Heater. Also,

PORTABLE RANGES and STOVES

In Large Variety.

239 and 241 Water Street, New York.

Liberty Stove Works.

Dealers in want of Stoves for the fall trade will please call and examine our full line of

RANGES AND PARLOR STOVES.

Having added to our stock several new and improved Ranges, Parlor and Cook Stoves this season, we can now please all sections of the country in desirable and useful Stoves.

CHAS. NOBLE & CO.,

Brown Street, above Fourth, *PHILADELPHIA.*

SAM. S. UTTER, Sales Agent,

113 Beekman Street. **NEW YORK.**

HUSSEY, BINNS & CO.,

PITTSBURGH.

SHOVELS, SPADES & SCOOPS.

SAM S. UTTER,

113 Beekman Street, New York.

THE SAM RANGE Is the greatest success of the age. It is now made in 13 sizes. Over 15,000 in use to-day.

Large sales being made of the new first-class cheap Range, **WIDE AWAKE.**

Now ready, the beautiful Base Burner for 1879. **LIBERTY PARLOR.**

The first-class self-feeder for 1879, **STAR KING,** and the new cheap self-feeder, both plain and extra finish, **FLORA.**

An immense variety of Cooking and Heating Apparatus for every want.

Agents for the Manufactures of CHAS. NOBLE & CO. Phila.

EVERYTHING AT POPULAR PRICES.

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STOVE PATTERN WORKS.

ESTABLISHED 1835.

Corner Fulton and Fourth Streets, TROY, N. Y.

Manufacturer of all kinds of STOVE PATTERNS RANGES, HEATERS &c. Always a large variety of the latest styles of iron patterns for sale. Undressed or dressed mold boarded and Flask ready for the sand.

PRESBREY STOVE LINING CO.,

Taunton, Mass.,

Stove and Range Linings of Every Kind.

CORRESPONDENCE SOLICITED. ORDERS PROMPTLY FILLED.

EMPIRE FORGES IMPROVED without Belts, Bellows, Crank Pins Dead Center or Back Motion. Send for circular.

EMPIRE PORTABLE FORGE CO., COHOES, N. Y.

GOLD MEDAL AWARDED PARIS EXPOSITION, 1878.

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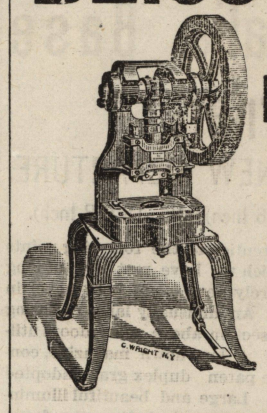

MANUFACTURERS OF ALL KINDS OF

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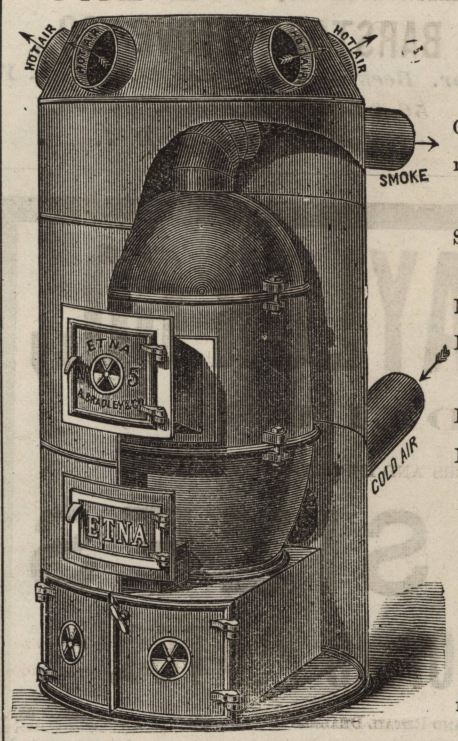
For Working Sheet Metals, &c.

FRUIT AND OTHER CAN TOOLS.

Plymouth, Pearl and John Streets, Brooklyn, N. Y.

THE ETNA FURNACE FOR 1879.



The best adapted Furnace in use for

Churches, Halls and Stores.

Constructed so as to make it not only economical in fuel, but durable.

Ash Pit extra large, also Dumping and Shaking Grate.

No. 3, without the Casing.....	$50.00
No. 3, with Casing, complete, ready for Pipes.....	70.00
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Discount to Trade.

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Manufacturers of the following Celebrated

STOVES, HEATERS AND RANGES.

Sunnyside Baltimore Fire Place Heater,
Fire Queen Cellar Heater and Brick Heaters,
Sunnyside Flat Top Ranges,
Rosedale Cooking Stove,
Barley Sheaf Cooking Stove,
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SPECIALTIES.

Enterprise Patent Cold Handle Double Pointed

SMOOTHING & POLISHING IRONS

CHAMPION TOBACCO CUTTERS,

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COFFEE, SPICE & DRUG MILLS,

SAUSAGE STUFFERS,

FRUIT, LARD and JELLY PRESSES,

CHAMPION DRIED BEEF SHAVERS,

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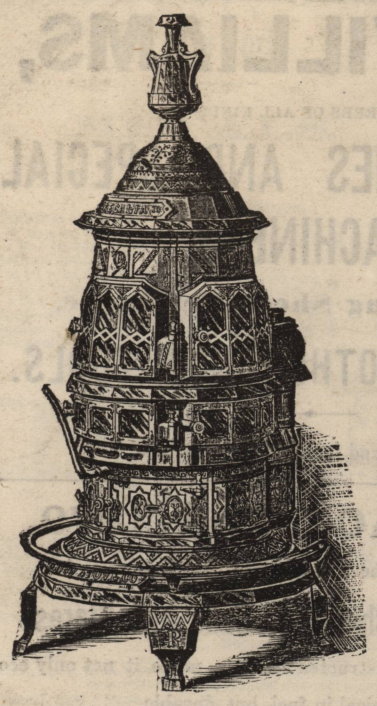

BARSTOW'S New Regalia Base Burner.

AN ENTIRELY NEW DEPARTURE.

TWO SIZES, No. 16 (16 Inch); No. 18 (18 Inch).

We would call especial attention to the following points of merit, in combining which we have met a want long felt by the public: An entirely new form, both novel in design and ornamentation. An unusually large radiating surface in the base. The section above mica doors utilized as radiating surface. A low down magazine, convenient to be reached. The paten duplex grate, adopted in a new and original form. Large and beautiful illumination and tasteful nickel trimmings, including our fancy nickel outside mica sash.

Send for circular and prices.

BARSTOW STOVE CO.,

Cor. Beekman & Water Streets, N. Y.
56 & 58 Union Street, Boston,
And Providence, R. I.

Joseph Byrne & Co.

Importers of

TIN PLATE

And Dealers in

METALS,

86 Beekman Street, NEW YORK.

O. W. GRAVES & CO.,

METAL BROKERS,

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TIN PLATE, PIG TIN, IRON WIRE, SHEET IRON, BRASS and COPPER GOODS, &c.

BRUCE & COOK,

Importers of

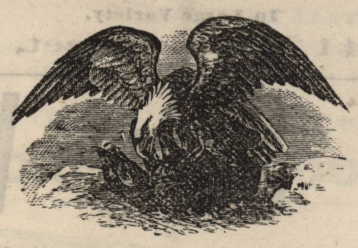
TIN PLATE, SHEET IRON, COPPER,

Sheet Zinc, Block Tin, Wire, &c.,

TINMEN'S TOOLS & MACHINES,

186, 188 & 190 Water St., and 248 & 250 Pearl St., N. Y.

W. D. WOOD & CO.'S



Patent Planished Sheet Iron.

Patented March 14th, 1865; April 8th, 1873; Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1875.

Guaranteed fully equal in all respects to the IMPORTED RUSSIA IRON, and at a much less price.

FOR SALE

By all the Principal Metal Dealers in the Large Cities Throughout the United States,

And at their Office, 111 Water St., PITTSBURGH, PA.

N. & G. TAYLOR CO.,

PHILADELPHIA,

MANUFACTURERS AND IMPORTERS OF

ODD SIZES

TIN and ROOFING PLATES.

WHOLESALE AND RETAIL DEALERS IN

Regular Sizes, Special Sizes, Odd Sizes,

Irregular Sizes and Circles.

TIN PLATES FOR EVERY CONCEIVABLE PURPOSE.

A Specialty of Sizes

—FOR—

DAIRY APPARATUS, CREAMERIES and MILK CANS,

—ALSO—

TINSMITHS', ROOFERS', COPPERSMITHS', TRUNK MAKERS'. STOVE DEALERS', PLUMBERS', and TYPE FOUNDERS' GAS FITTERS', BRASS FOUNDERS', MACHINISTS',

SUPPLIES GENERALLY.

Black and Galvanized Sheet Iron, Copper, Zinc, Rivets, Wire, Metals, Stamped Ware, Registers, Ventilators, &c.

We can manufacture, at the shortest possible notice, any size sheet, gauge or quality of Tin Plate, Roofing Tin, Sheet Iron, Sheet Lead, Sheet Copper, Sheet Zinc, &c., that may be wanted.

The Trade is not compelled to buy from other parties an unsatisfactory size, that cuts to waste, when they can send to us and get exactly what they want.

☞ Let Us Have Your Orders. ☜

N. & G. TAYLOR CO.,

Established 1810. PHILADELPHIA.

MONITOR ASH CANS.

THE ONLY PERFECT ASH CAN.

MANUFACTURED BY

F. HABERMAN,

294 Pearl Street, New York.

Nos.....	1	2	3	4	5	6
Inches....	13X13	14X15	15X24	17X24	18X24	20X24
Each.....	$2.75	3.25	4.75	5.75	6.25	6.75

Discount, 40 %.

The superiority of this Can over all others is in the construction of the bottom, which, instead of resting directly on the ground, is protected by a heavy wrought-iron rim, riveted to the body of the can; the rim having a flange or recess for the body to rest in, protects the Can from bruise or damage when coming in contact with hard substances, and prevents rust.

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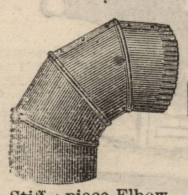
STOVE PATTERN WORKS.

All kinds of Stove Patterns made to order. For sale, duplicate iron patterns of Cooking, Parlor and Heating Stoves.

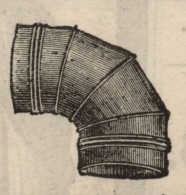
452 Fulton Street, Troy, N. Y.

SARGENT'S



Patent Adjustable Elbows

AND



Stiff 4-piece Elbow

Burrows' Stiff Four-Piece Elbows.

Adjustable Elbow.

MANUFACTURED OF

Charcoal, Russia, Galvanized Iron and Tin.

Diameters, 1 inch and larger.

THE BEST AND MOST CONVENIENT ELBOW IN THE MARKET.

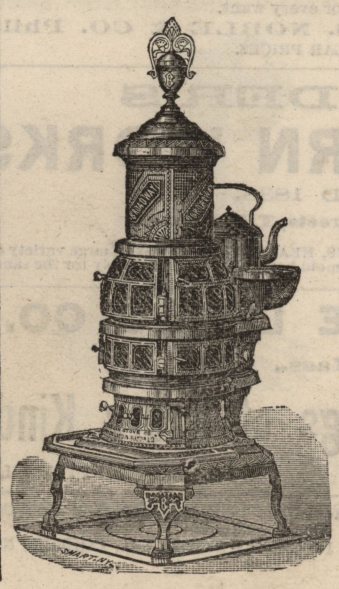
For sale by the trade generally.

ABENDROTH & ROOT MFG. CO., 28 Cliff St., N. Y.

Sole Eastern Agents.

Also manufacturers of **Root's Patent Spiral Tubing, &c.**

THE BROADWAY.



The Most Attractive, Medium-Priced Base Burner in the Market.

Possessing the following distinctive features:

PERMANENT ATTACHMENT for accommodating a full-sized tea kettle.

LARGE DUST FLUES, preventing the escape of dust and ashes into the room.

COMBINATION GRATE for removing clinkers without the use of the poker.

PARTIAL RETURN FLUE, securing greatly increased radiating power.

EVERY STOVE also has HIGHLY POLISHED EDGES, PLATED FOOT RAIL and SWING SHELF.

THREE SIZES, Nos. 5, 10, 15.

ONE SIZE WITH OVEN, No. 15.

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Successors to BOSTON & MAINE FOUNDRY CO.,

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